AN EARLY FUNCTIONAL OUTCOME ANALYSIS OF ARTHROSCOPIC STIFF SHOULDER RELEASE IN ADHESIVE CAPSULITIS

Dissertation submitted to

THE TAMILNADU DR.M.G.R.MEDICALUNIVERSITY

CHENNAI-TAMILNADU

In partial fulfillment of the regulations
for the award of the degree of

M.S. DEGREE
BRANCH – II
ORTHOPAEDIC SURGERY

KILPAUK MEDICAL COLLEGE

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APRIL 2016

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CERTIFICATE

This is to certify that **Dr.Sundaramoorthi.K,** Post Graduate Student (2013-2015) in the Department of Orthopedic Surgery, Kilpauk Medical college, has done dissertation on **"AN EARLY FUNCTIONAL OUTCOME OF ARTHROSCOPIC STIFF SHOULDER RELEASE IN ADHESIVE CAPSULITIS**" under my guidance and supervision in partial fulfillment of the regulation laid down by the "TAMILNADU DR.M.G.R.MEDICAL UNIVERSITY,CHENNAI-32" for ms orthopedic surgery degree examination to be held in April 2016.

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DECLARATION

I **Dr. Sundaramoorthi K**, solemnly, declare that this dissertation titled **"AN EARLY FUNCTIONAL OUTCOME ANALYSIS OF ARTHROSCOPIC STIFF SHOULDER RELEASE IN ADHESIVE CAPSULITIS"** is a bonafide work done by me at Government Royapettah hospital, Kilpauk Medical College, during a period from 2013 to 2015,under the guidance and supervision of Prof.G.LEONARD PONRAJ M.SOrtho,MCh Ortho.This dissertation is submitted to "THE TAMILNADU DR MGR MEDICAL UNIVERSITY", towards partial fulfillment of regulations for the award of M.S.DEGREE BRANCH II in orthopaedic surgery.

Place : Chennai

Date: **Dr. Sundaramoorthi. K**

ACKNOWLEDGEMENT

I my utmost gratitude to Prof.Dr.NARAYANABABU M.D, Dean, Kilpauk medical college, Chennai, for providing me an opportunity to conduct this study and for permitting me to use the hospital facilities for my study to full extent.

I would like to express my gratitude and reverence to my beloved Head of Department, Prof.N.NAZEER AHMED,M.S(Ortho),D.Ortho, for permitted to conduct the study and guidance elevated me to this level ,to conduct this study successfully. I sincerely thank him for the expert guidance and constant encouragement to conduct this study.

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Prof .S.ANBHAZHAGAN, M.S (Ortho), D.Ortho, DNB (Ortho),

Prof .K. RAJU M.S (Ortho), D.Ortho for their constant encouragement and guidance.

I am deeply indebted to my beloved Assistant Professors

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Dr. KOSALARAMAN M.S Ortho,D.Ortho

Dr. FAKHRUDDIN M.S Ortho

Dr. VIKRAM M.S Ortho

Not only for guiding me in every aspect of this study but for the whole of my postgraduate career as well their valuable advice and guidance.

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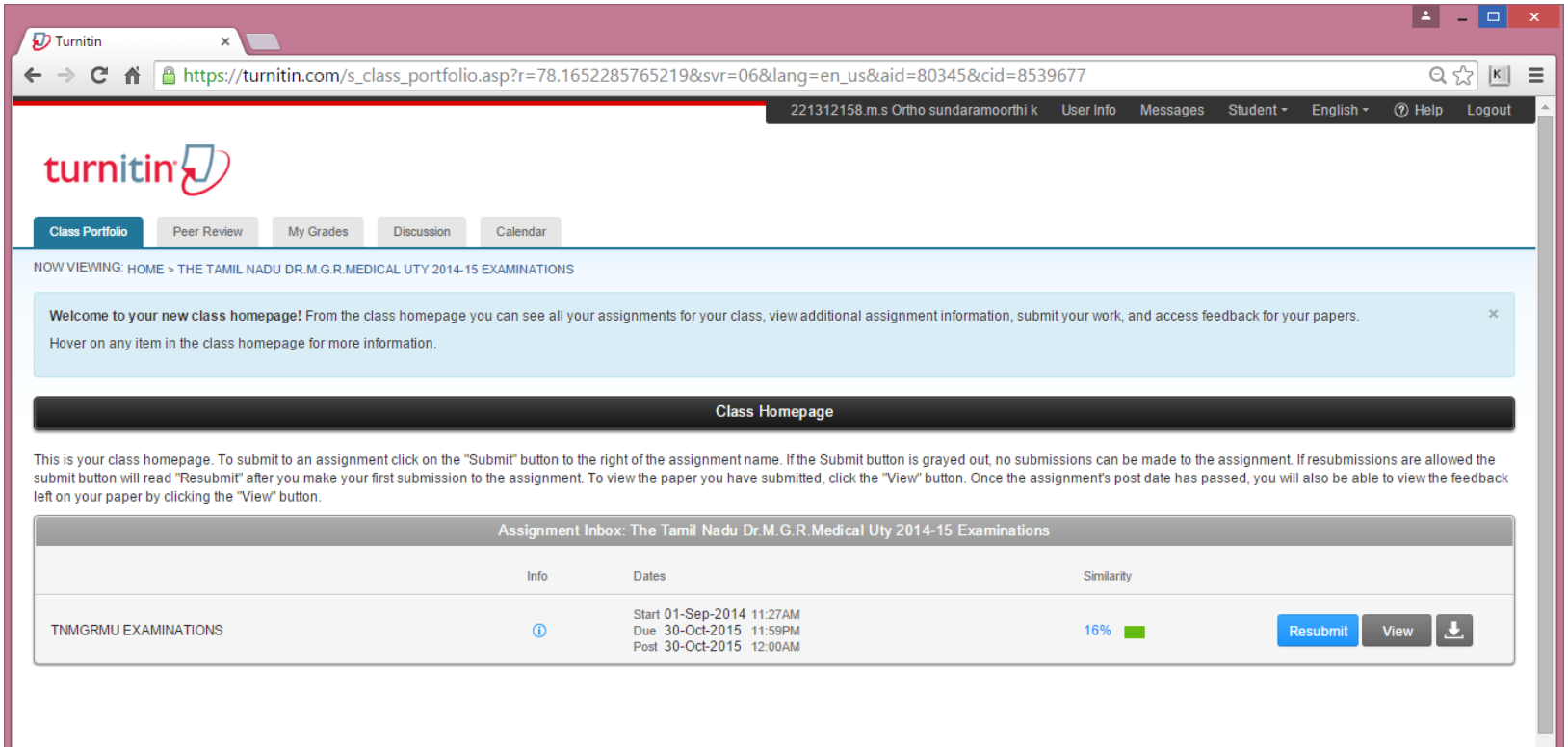
I wish to express my thanks to anaesiologist, postgraduate colleagues, staff members and theatre staff for the help they have rendered.

I thank to all my patients who gave full co-operation for this study without whom this study wouldn’t be possible.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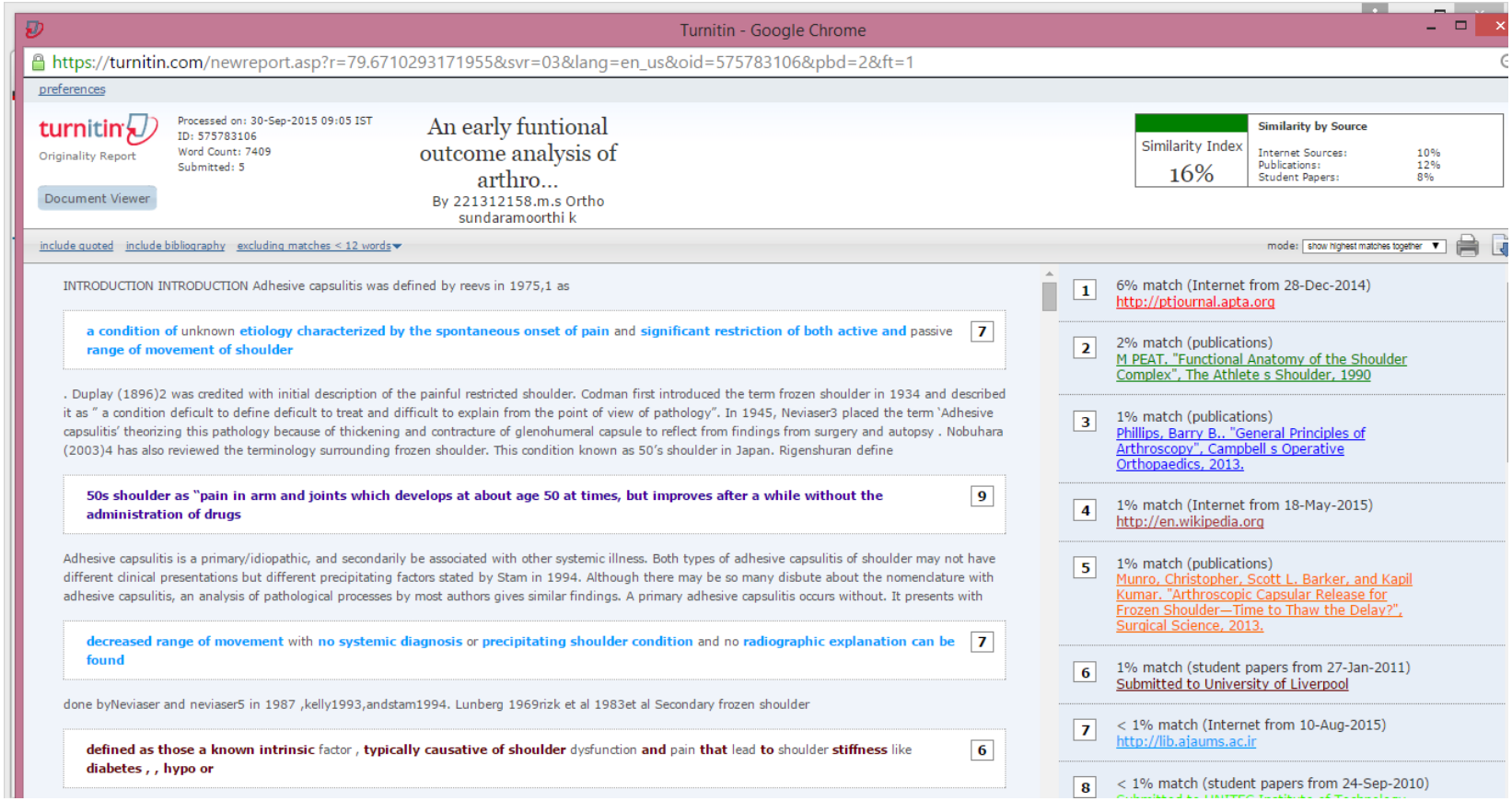
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INTRODUCTION INTRODUCTION Adhesive capsulitis was defined by reevs in 1975,1 as
a condition of unknown etiology characterized by the spontaneous onset of pain and significant restriction of both active and passive range of movement of shoulder 7
. Duplay (1896)2 was credited with initial description of the painful restricted shoulder. Codman first introduced the term frozen shoulder in 1934 and described it as " a condition deficult to define deficult to treat and difficult to explain from the point of view of pathology". In 1945, Neviaser3 placed the term 'Adhesive capsulitis' theorizing this pathology because of thickening and contracture of glenohumeral capsule to reflect from findings from surgery and autopsy . Nobuhara (2003)4 has also reviewed the terminology surrounding frozen shoulder. This condition known as 50's shoulder in Japan. Rigenshuran define
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1 6% match (Internet from 28-Dec-2014) http://ptjournal.apta.org
2 2% match (publications) M PEAT. "Functional Anatomy of the Shoulder Complex", The Athlete s Shoulder, 1990
3 1% match (publications) Phillips, Barry B.. "General Principles of Arthroscopy", Campbell s Operative Orthopaedics, 2013.
4 1% match (Internet from 18-May-2015) http://en.wikipedia.org
5 1% match (publications) Munro, Christopher, Scott L. Barker, and Kapil Kumar. "Arthroscopic Capsular Release for Frozen Shoulder—Time to Thaw the Delay?", Surgical Science, 2013.
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CONTENTS

ABSTRACT

AN EARLY FUNCTIONAL OUTCOME ANALYSIS OF ARTHROSCOPIC STIFF SHOULDER RELEASE IN ADHESIVE CAPSULITIS

INTRODUCTION:

The prevalence is approximately[6] 2-5% of adults in general population. It seems to develop between the ages of 40 to 60. Adhesive capsulitis commonly presents as unilateral pathology. In diabetic[9] prevalence is 20%.It is the most common disabling condition of the musculoskeletal manifestations in diabetes.

AIM:

To assess the early functional outcome analysis of arthroscopic stiff shoulder release, mean recovery time and associated comorbidities in adhesive capsulitis.

MATERIALS AND METHODS:

The present study was carried out in the Government Royapettah Hospital (GRH), Kilpauk Medical College from May 2013 to September 2015. The study consists of total 17 patients of adhesive capsulitis satisfying the inclusion criteria, who are treated with Arthroscopic Release. It was a PROSPECTIVE STUDY.

DISCUSSION:

In our study, most of the patients with adhesive capsulitis were female with the mean age of 51.5 years old. Left shoulder was affected more frequently than the right side. Almost 35.2% of patients suffered from diabetes mellitus. All of the patients recovered from pain and achieved their highest range of motion at mean time of 6 weeks. Shoulder range of motion and clinical outcomes improved significantly it clearly seen by pre and post-operation score

RESULTS:

In our study most common associated co-morbidity is diabetes mellitus followed by hypertension. The correlation between adhesive capsulitis and hypertension needs large controle syudies. Mean recovery time is 1.5 month.

INTRODUCTION

Adhesive capsulitis was defined by reevs in 1975,[1] as a condition of unknown etiology characterized by the spontaneous onset of pain and significant restriction of both active and passive range of movement of shoulder . Duplay (1896)[2] was credited with initial description of the painful restricted shoulder. Codman first introduced the term frozen shoulder in 1934 and described it as " a condition difficult to define difficult to treat and difficult to explain from the point of view of pathology". In 1945, Neviaser[3] placed the term 'Adhesive capsulitis' theorizing this pathology because of thickening and contracture of glenohumeral capsule to reflect from findings from surgery and autopsy . Nobuhara (2003)[4] has also reviewed the terminology surrounding frozen shoulder. This condition known as 50's shoulder in Japan. Rigenshuran define 50s shoulder as "pain in arm and joints which develops at age 50 at times, but improves after a while without the administration of drugs Adhesive capsulitis is a primary/idiopathic, and secondarily be associated with other systemic illness. Both types of adhesive capsulitis of shoulder may not have different clinical presentations but different precipitating factors stated by Stam in 1994. Although there may be so many

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A primary adhesive capsulitis without any intrinsic pathology, presents with decreased range of movement with no systemic diagnosis or precipitating shoulder condition and no radiographic explanation can be found done by Neviaser[5,] in 1987, kelly1993,andstam1994. Lunberg 1969 rizk et al 1983 et al, Secondary frozen shoulder defined as those a known intrinsic factor, typically causative of shoulder dysfunction and pain that lead to shoulder stiffness like diabetes , hypo or hyper thyroidism, cardiac disease, stroke and in associated with prolonged immobilization or trauma and also in rotator cuff disease . The study is investicating primary or true 'Adhesive capsulitis'.

AIM

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To assess the early functional outcome analysis of arthroscopic stiff shoulder release ,mean recovery time and associated comorbidities in adhesive capsulitis.

ANATOMY AND BIOMECHANICS OF SHOULDER

ANATOMY

SHOULDER JOINT CONSIST:

***BONES* :**

1. Scapula
2. Clavicle
3. Humerus

ARTICULATIONS:

1. Gleno-humeral joint
2. Acromio-clavicular joint
3. Sterno-clavicular joint
4. Scapula thoracic joint

SHOULDER STABILIZERS:

STATIC

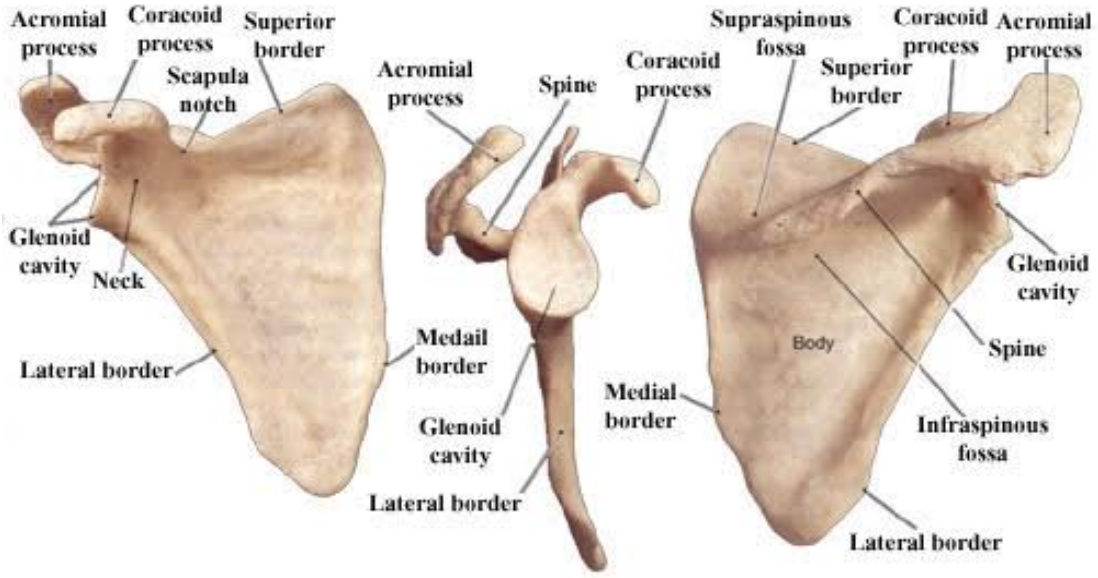
1. Bone geometry
2. Glenoid labrum
3. Capsule& Ligaments
4. Intra- articular pressure

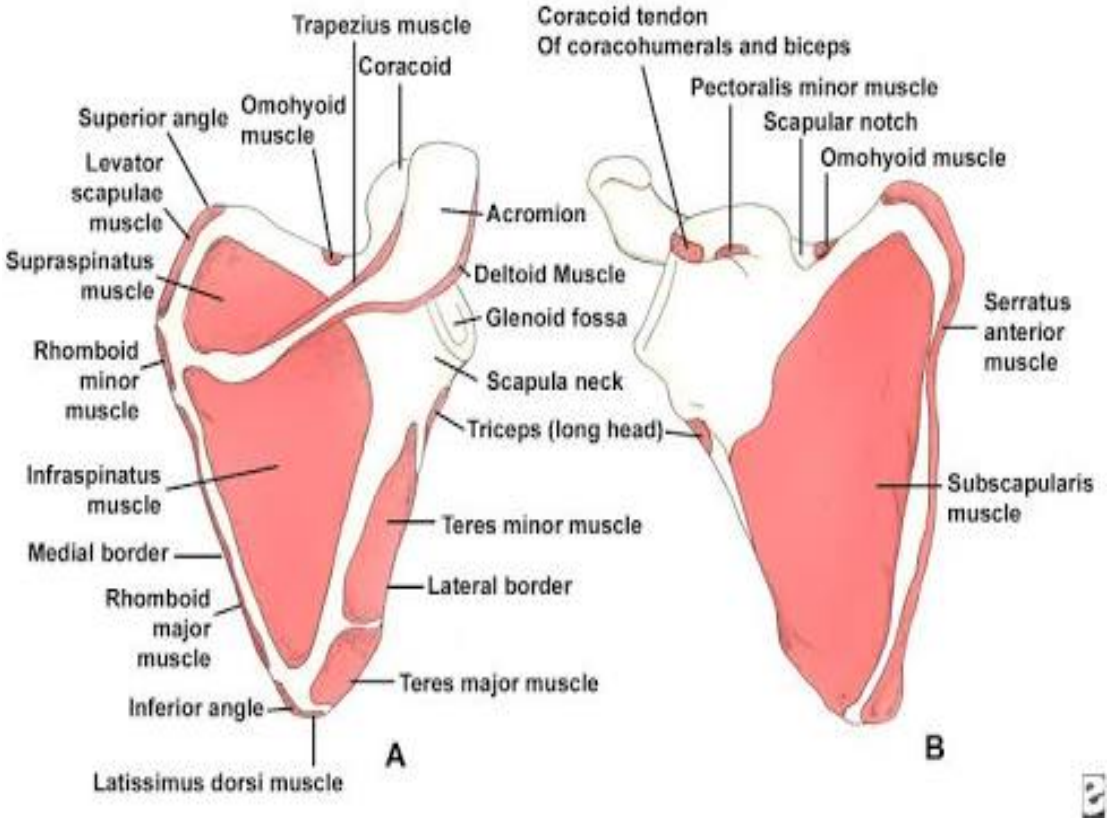
DYANAMIC

1. Primary stabilisers
2. Secondary active stabilisers
3. Neuro muscular control

Bones:

Scapula:





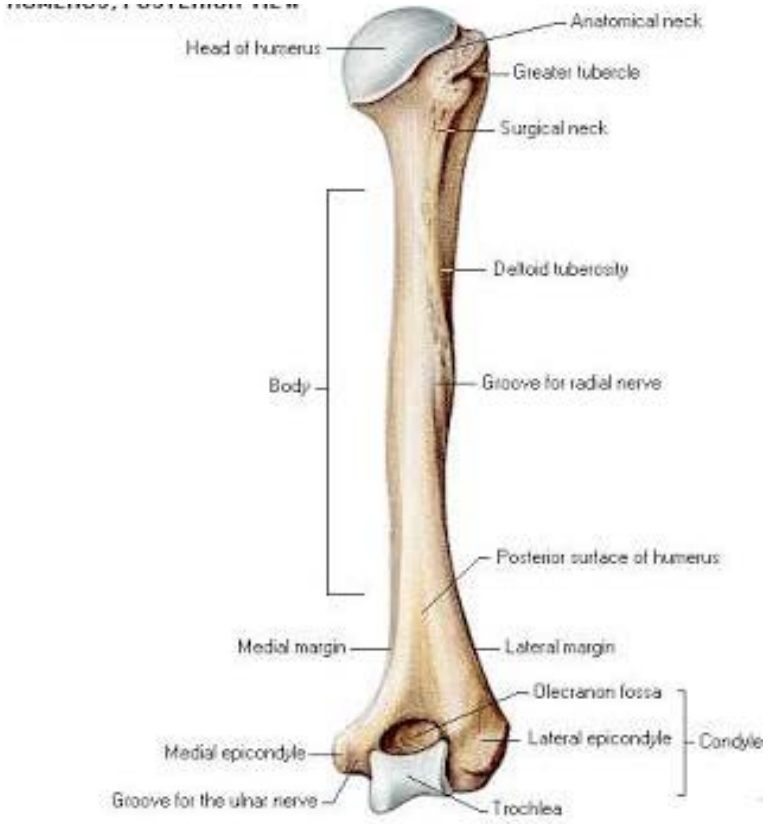
The scapula is a thin bone. The main function of scapula is a site of muscle attachment. Its medial border is parallel to the spine, the lateral and superior borders are oblique. It has a superior, a lateral and an inferior angle. The inferior angle corresponds to the interspinal level between the spinous processes of T7 and T8.

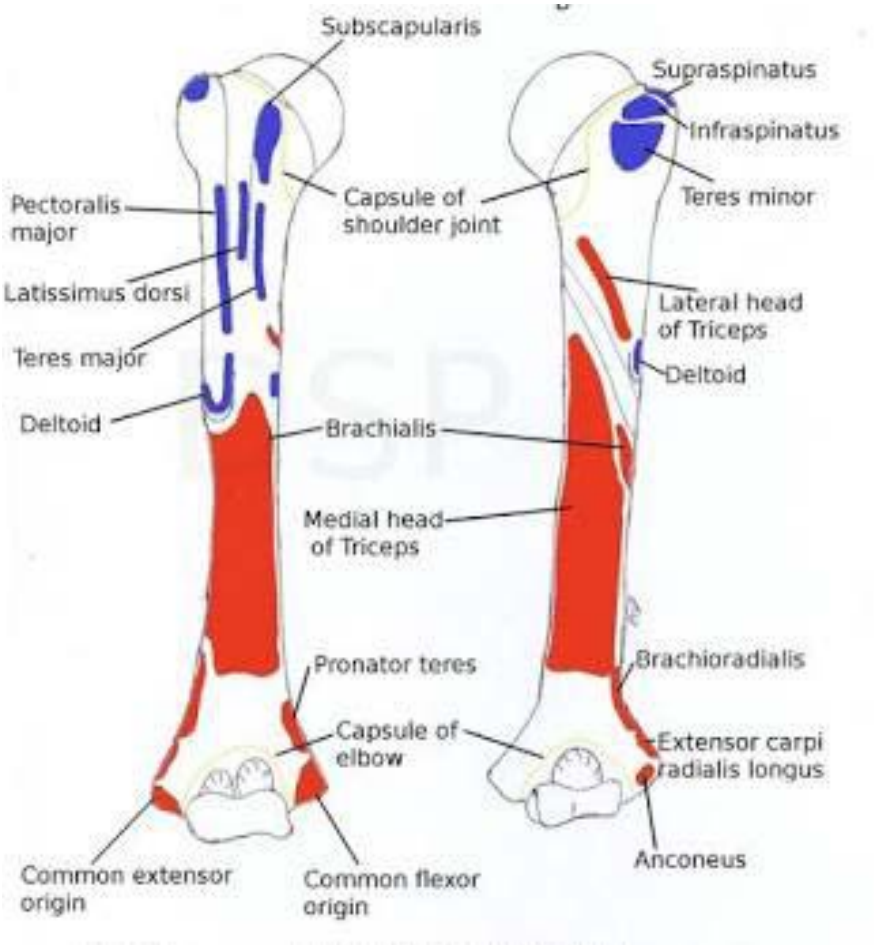
The scapula contains four processes: the acromion, the coracoid, the spine and the articular process the glenoid.

The dorsum of the scapula is convex. It is divided by its spine into two fossa: the supraspinal and infraspinal fossa, containing the corresponding muscles. The scapular spine runs in the medial border between the junction of middle and upper 1/3 junction, where it is rather flat, and corresponds to the level of the third thoracic spinous process. Laterally it becomes more prominent and meets the acromion at a right angle posteriorly. It is easily palpable angle which is important bony landmark The acromion turns further anteriorly,which covers part of the head of humerus. The process of corocoid is found at the anterior aspect of the scapula. The tip points outwards and is easily palpated in the lateral part of the subclavian fossa. Further down, on the anterior aspect of the scapula, is a large concavity which contains the subscapularis muscle.

At the lateral angle, just beyond the neck of the scapula, is the glenoid fossa. This has a rather shallow surface, which is directed anterolaterally and slightly cranially tilted. It is approximately one-quarter the size of the humeral head and this, plus its shallow concavity, makes the joint both very mobile and vulnerable to subluxations. The ventral surface of the scapula is flat and covered with the attachment of the subscapularis muscle, except for the medial border and inferior angle where the serratus anterior muscle is inserted.

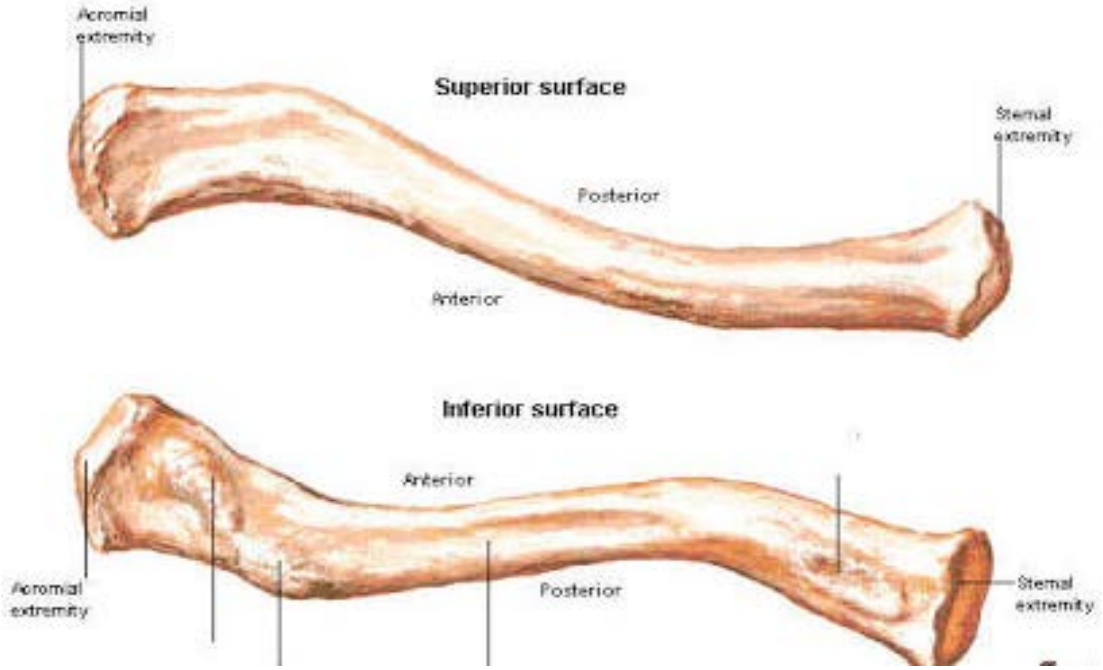
Humerus :

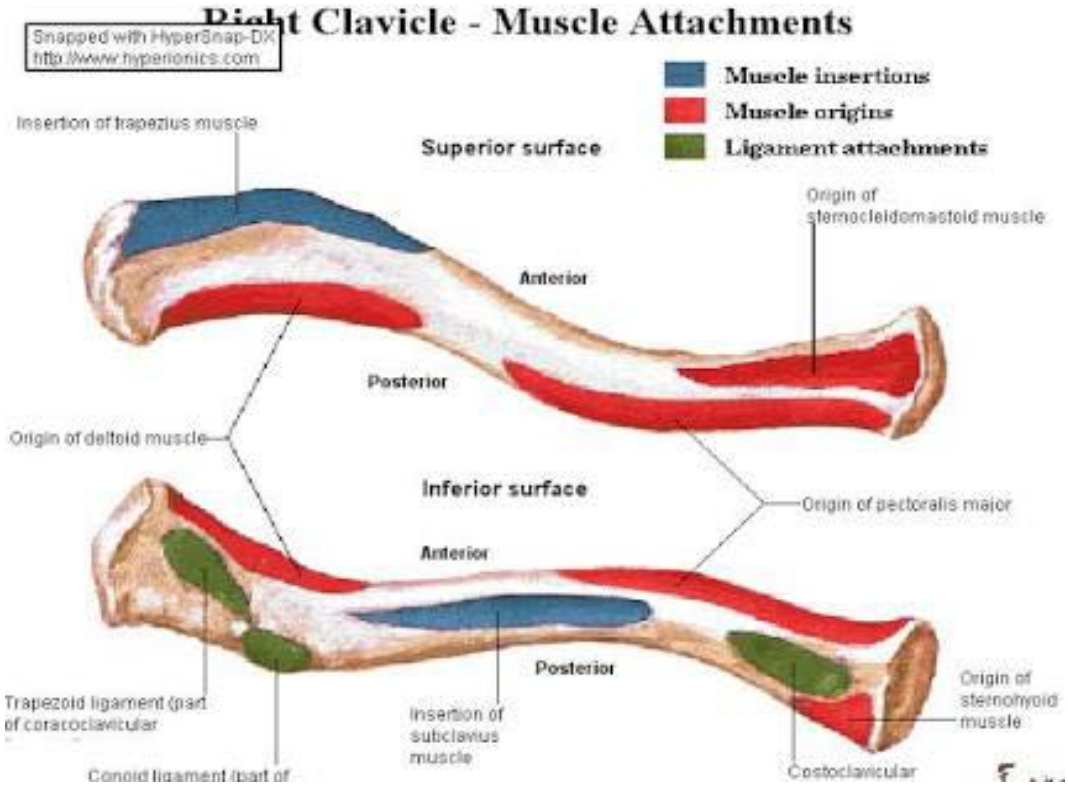




The articular surface of the humeral head points in a medial, posterior and slightly caudal direction and is separated from the major and minor tuberosities by its anatomical neck. When the arm is hanging down the side with its anterior aspect facing the body, the greater tuberosity lies laterally and the lesser tuberosity anteriorly. They are separated from each other by the bicipital sulcus .

Clavicle


Acromial extremity
Superior surface
Sternal extremity
Posterior
Anterior
Inferior surface
Anterior
Acromial extremity
Posterior
Sternal extremity


Right Clavicle - Muscle Attachments
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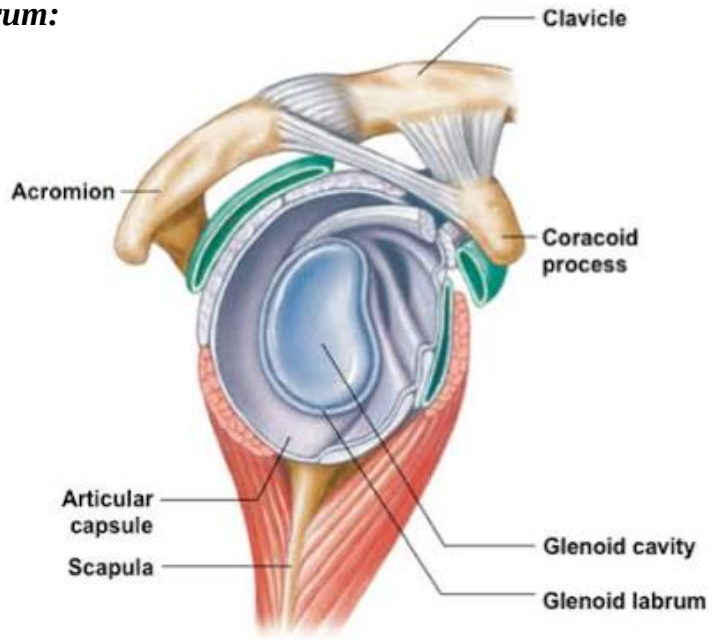
Muscle insertions
Muscle origins
Ligament attachments
Insertion of trapezius muscle
Superior surface
Origin of sternocleidomastoid muscle
Anterior
Posterior
Origin of deltoid muscle
Inferior surface
Origin of pectoralis major
Anterior
Posterior
Origin of sternohyoid muscle
Trapezoid ligament (part of coracoclavicular
Insertion of subclavius muscle
Costoclavicular
Conoid ligament (part of

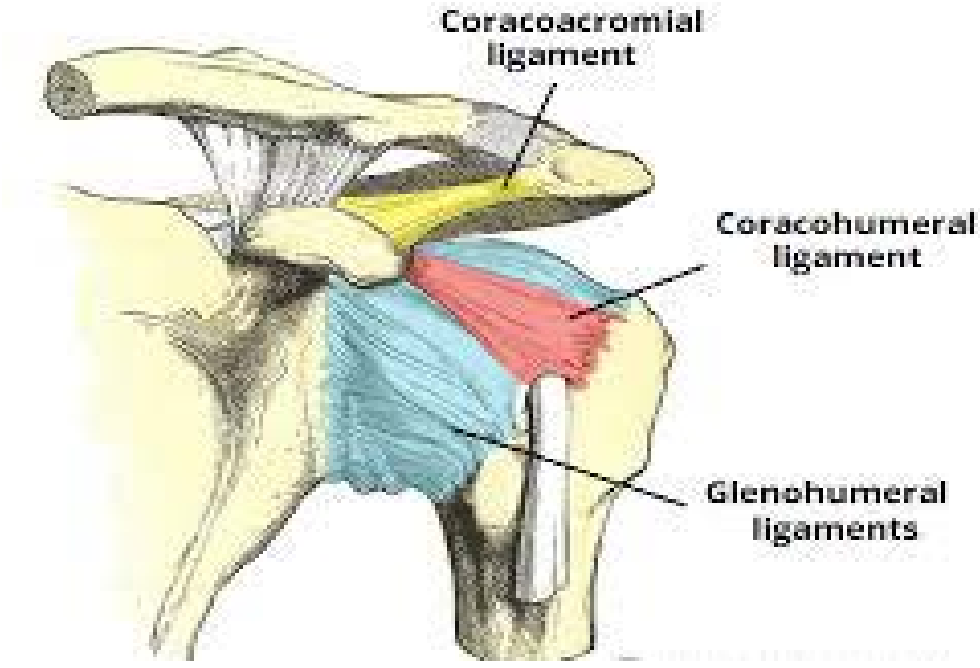
The clavicle joins the sternum to the acromion. At its medial end it has a forward convexity whereas its lateral end is rather more concave .The joint capsules of both the sterno-clavicular and the acromio-clavicular joints are reinforced by several ligaments. The clavicle has many muscular and ligamentous attachments. The insertion of the coracoclavicular ligament is of practical importance. It is found laterally on the inferior aspect of the clavicle, and just medial to it is the origin of the subclavius muscle. The clavicle gives support to the shoulder girdle by acting as a strut between scapula and sternum. Due to its S-shape, the outer end describes a much larger rotation during arm elevation than its inner end. Therefore, lesions of the acromioclavicular joint ligaments are more frequent than are lesions of the sternoclavicular joint ligaments.

Glenoid Labrum:



The glenoid labrum is a ring of fibro-cartilagenous tissue .It has attached in the glenoid fossa. The labrum makes the articular cavity deep . It also protects the corners of bone. It minimally contribute in joint lubrication also. The labrum's inner surface is lined with synovium and it's outer surface attached with the capsule . Till scapular neck it has continued with periosteum. Because of the oval shape of the labrum, it can contain the humeral head while rotation , and increase the flexibility for the glenoid fossa. Biceps and triceps muscles tendon reinforce the glenoid labrum. The labrum's major function is to act as an site for attachment of gleno-humeral ligaments.

Joints and intracapsular ligaments:



Gleno-humeral Ligaments :

In anterior part of gleno-humeral joint has three glenohumeral ligaments. It seems to be the thickened part in the capsule. The superior gleno-humeral ligament(SGHL) attaches from glenoid labrum's the upper part and coracoid process to the anatomical neck and the lesser tuberosity of the humerus. It lies just behind the coraco-humeral ligament. The SGHL and the supraspinatus muscle combined with the coracohumeral ligament preventing the humeral head to displace downward. The middle gleno-humeral ligament (MGHL) have broad attachment from the superior gleno-humeral ligament with the anterior margin of the glenoid fossa to middle and inferior thirds of the glenoid rim. The ligament goes outward, gradually enlarges, and attaches with the humerus anatomical neck in anterior aspect. The MGHL lies beneath the subscapularis muscle and also adheres with it. In 90 degree abduction the MGHL limits lateral rotation.. It is important stabilizers in anterior aspect of the shoulder joint during in the middle of abduction.

The thickest component in glenohumeral complex is inferior gleno-humeral ligament. The ligament (IGHL) attach from posterior, anterior and inferior margins of glenoid labrum to humerus in the inferior part of the surgical

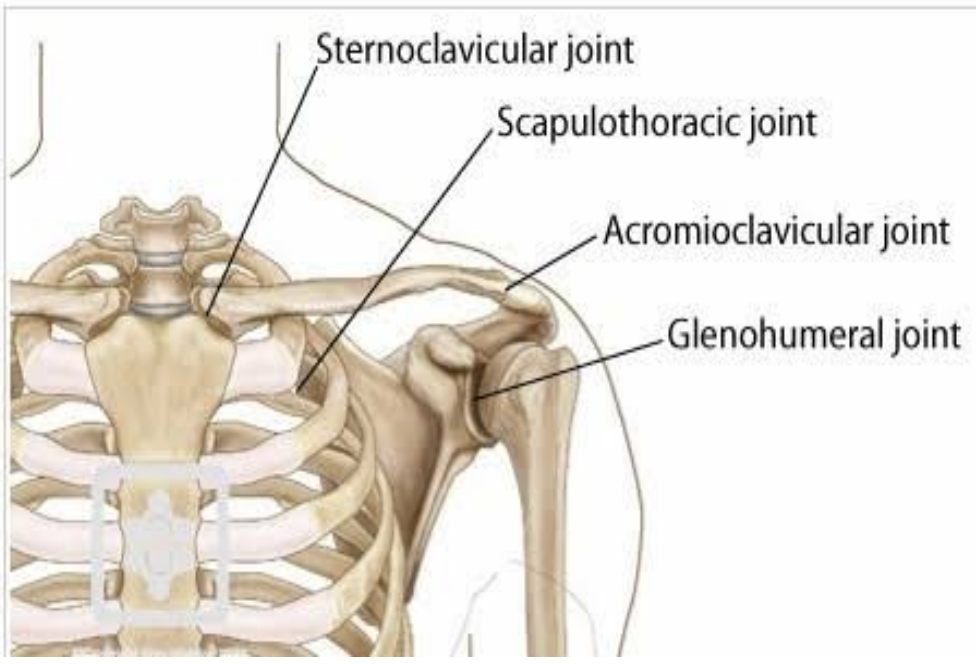
and anatomical necks . The *superior band* lies in the antero-superior edge of this ligament, which is thickened part of IGHL. *Axillary pouch* is thinner and broader which lies in inferior part. The superior band strengthens anteriorly . It mainly supports in the middle of abduction movement. The inferior part provides a broad buttress support in inferior and anterior aspects of the joint. In upper range of abduction it prevents anterior dislocation.

Coraco-acromial Ligament :

It is a triangular ligament with attachment in to the coracoids process's lateral border and passes upward,outward and slight posteriorly to the acromian process.The deltoid muscle is covered in uppermost area .The Superaspinatus muscle cover this ligament in posterior aspect and continuous as fascia . It has well defined free border in anterior aspect. The acromion and coracoids processes together with this ligament forms an protective arch in upper part of shoulder joint. It forms a socket which protect the joint from trauma from superior aspect .So it can prevent the superior dislocation of the humeral head. The supraspinatus muscle goes beneath the coraco-acromial arch which lies between the capsule of the gleno-humeral joint and deltoid muscle. Finally it blends with the capsule. The sub-acromial bursa seperates the supraspinatus tendon from the arch. In elevation

of arm, the greater tuberosity pushed against the antero- inferior surface of the acromion and coroco-acromial ligament. In some circumstances, the impingement occur against the acromio-clavicular joint also. Majority of upper limb functions are performed with the hand placed in front of the body. When Arm goes for flexion movement the superaspinatous tendon crushed between the humeral head and anterior aspect of acromion and acromio-clavicular joint leads to wearing of this tendon and long head of biceps tendon

Gleno-humeral joint:



The gleno-humeral joint is a poly-axial ball and socket type of synovial joint. The articular surface of humeral head and glenoid are reciprocally curved and spherical not merealy a round.The humerus's head is bigger than the glenoid.

It leads to only a part of humeral head can articulate with the glenoid . Because of loose packaging, the surfaces are not congruent. If we rotate the humerus internally and in abduction, close-packed position the full congruence are obtained. The joint are typical a incongruous joint. Because of this anatomical variation ,the muscular balance around the shoulder joint is important for maintaining the stability. The radius curvature of the humeral articular surface is 35 to 55 mm. The angle between the joint with the shaft of humerus is 130 to 150 degrees and retroverted 20-30 degrees with respect of the axis of flexion of the elbow .The fossa of glenoid is pear shaped. The surface area is 1/3rd to 1/4th of the humeral head. The 75% of the vertical diameter and 60% of transverse diameter of the humeral head. In 75% of population the glenoid fossa is 7.4 degree retro-tilted in relation with the plane of scapula. For maintain the horizontal stability it is very important. So it can prevent the anterior dislocation of shoulder joint.

Acromio-clavicular joint:

Acromio-clavicular joint is a synovial type of joint between the convex lateral end of clavicle and concave of acromial process. Because of this the joint line is oblique and slightly curved. This makes joint to favour the forward and

backward movement of scabula over the clavicle. With this movement the glenoid fossa of scabula makes face the humeral head in continuous . The anatomical peculiarity in this joint makes acromion go under the clavicular end while the force transmitted through this joint. This joint is very important not only for transmitting the force to clavicle but also for the shoulder movement also. In superior aspect of this joint the capsule thickened and form acromio-clavicular ligament which protect the joint.The major structure stabilizing the joint is the coraco-clavicular ligament.

The coraco-clavicular ligament consists of two parts:

1) The trapezoid

2) The conoid ligament .

The anatomy and function of this two ligament is different but they are united in their corresponding border. A bursae filled the space in the anterior aspect. Actually this bursae lies between the inferior surface of the clavicle and the medial end of the coracoids process. Almost in 30% population the corocoid placed very closely with the clavicle and form the coraco-clavicular joint.These ligaments suspend the scapula from the clavicle. The antero-lateral part of coraco-clavicular ligament and trapezoid is broad,thin and quadrilateral in shape.

It is attached from below to the superior surface of the coracoids process. The ligament goes outward almost horizontally to the inferior surface of the clavicle. A fall on the outstretched hand will tend to push the acromion under the clavicle because of the tilt of the articular surfaces. This is resisted by the trapezoid ligament. The conoid ligament placed in postero-medial aaspect to the trapezoia ligament. It is thick ligament with triangular in shape and it's base attached to the conoid tubercle of the clavicular. The triangular apex is attached to the knuckle of the clavicle. The conoid ligament is placed in vertical orientation and twisted manner. The ligament limits the superior motion of the clavicle over acromion.When arm moved to over head abduction leads to move scabula and corocoid process,which rise the tension in conoid ligament lead to backward axial rotation of clavicle . In axial view, the clavicle has a shape of a crank. As scapular movement occurs, the coracoids process is pulled downward and away from the clavicle. The taut coraco-clavicular ligament which acts on the outer curvature of the crank-like clavicle and effects a rotation of the clavicle on its long axis. The clavicle rotates 50 degrees axially, during full abduction of the arm. This clavicle movement favour for continuous upward elevation glenoid fossa which lead to increased range of abduction movement. If this rotation didn't occur ,arm can

abduct only for 120 degrees only. After 100 degrees of abduction the movement of clavicle is restricted by sterno-clavicular ligaments lead to lateral rotation scabula. The acromio-clavicular ligament has 3 degrees of movement in vertical axis. Movement can occur between the acromion and lateral end of clavicle.

Sterno-clavicular joint:

The sterno-clavicular joint is a ball and socket type of synovial joint functionally but plane variety in cross section. The articular surfaces lacks congruity. Because of shallow concave articulation of sternal end couldn't contain the large ball type of sternal end of clavicle. The intra- articular disc is attached to the small non articular superior-medial surface of clavicle. The remainder surface are concave antero-posteriorly, convex on medially.

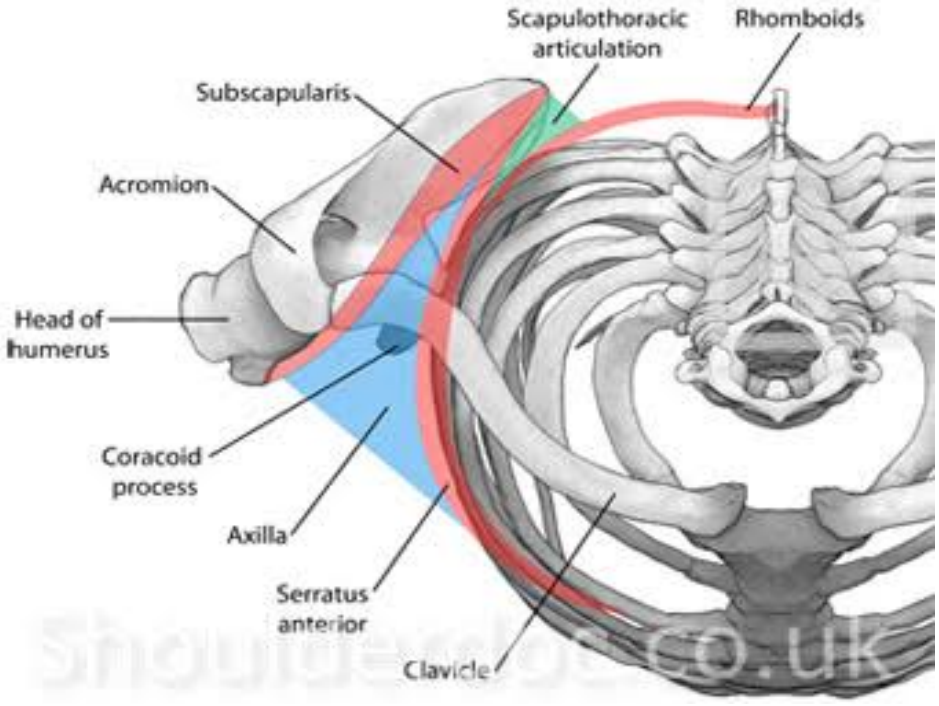
The medial side of clavicle has attached with sternum and first rib and it's costal cartilage. The ligaments has strengthening the capsule in circularly 360 degree. These important joint structures stabilizing the joint and resisting the tendency for medial displacement of the clavicle, and limiting the clavicular component of arm movement are the articular disk and the costo-clavicular ligament . The strong circular fibro-cartilagineous intra articular disc completely divide the articular surface. The intra articular disc has attached laterally on

supero-medial end of clavicle and inferiorly with the sternum's lateral and first costal surface. This anatomical peculiarity makes intra articular disc acts as a hinge. This mechanism that contributes to the total range of joint movement. This kind of attachment of articular disc makes this joint as stable one when force transmitting from clavicle to the sternum through this joint. Absence of this attachment or failure of this attachment leads to sterno-clavicular dislocation while force are transmitted . The costo-clavicular ligament is a bilaminar fasciculus with attached from inferior surface of medial end of clavicle to the costal surface. The anterior part of this ligament passes upward laterally and vice versa in posterior part. When shoulder protract or retract this ligament becomes taut and retain the the clavicle with sternum and first rib.

The joint capsule is supported by anterior and posterior oblique sterno-clavicular ligaments. the anteiror and posterior oblique sterno-clavicular ligaments has attached from medial end of the clavicle to run medial and downwards and to manubrium sternum. The posterior ligament becomes taut when protraction occurs and the anterior ligament is lax. At the time of retraction, the opposite is. This ligaments allows both antero-posterior and supero-inferior movements. The axis for both movements place close to the clavicular attachment of the

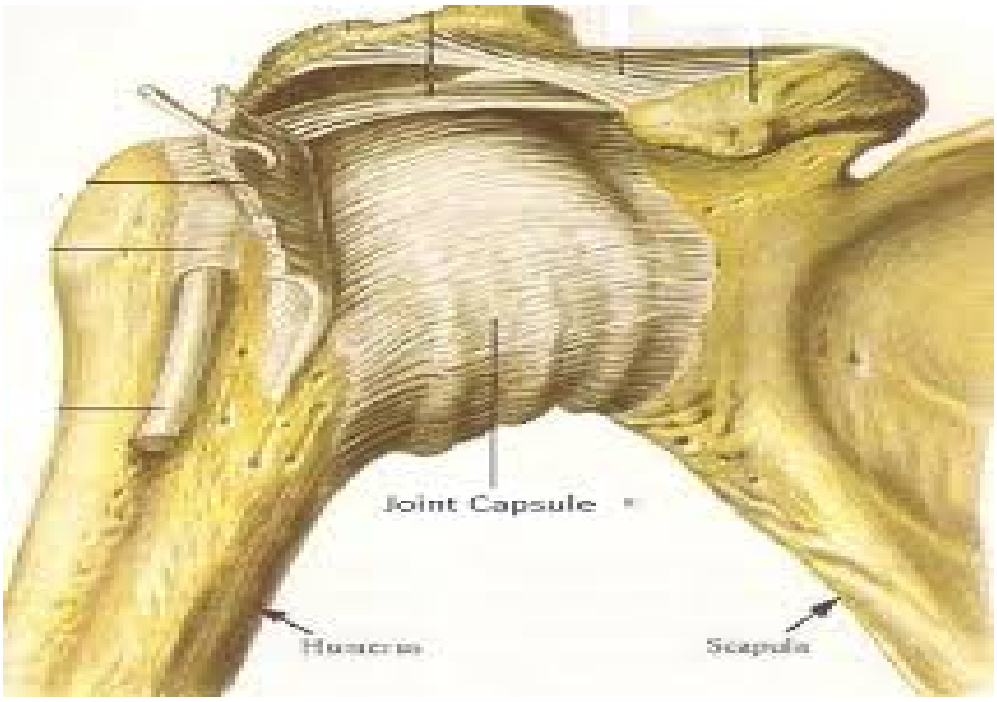
costoclavicular ligament. A inter clavicular ligaments runs in the superior aspect of the sterno-clavicular joint between the medial end of the clavicle. The deep fibers of this ligament have attachment with the manubrium and so gives the stability to the joint.The area of compression between the articular surface and the disc may vary with the clavicular movements. When movements like protraction or retraction ,elevation or depression occurs the side of the ligament relax and the opposite ligament goes taut. It causes variable area of compression between the sternum, clavicle and first rib. During downward and upward movement the greatest movement occurs between the clavicle and disc, likewise while antero-posterior movement most of the movements occurs between the disc and sternum. The combination of pressure across the articular surface and disc, taut ligaments makes joint stable. Forces acting on the clavicle from the upper limb occasionally cause dislocation of the sterno-clavicular joint. While greater force applied across the clavicle cause the fracture medial to the corococlavicular ligament only.

Scapulo-thoracic articulation:



There is no ligamentus or bony contact between the scapula and thorax except the sterno-clavicular,acromio-clavicular joint. The scabulo-thoracic movement is not a true joint movement. It's gliding between the concave surface of scapula and convex surface of the thorax . The scapula and thorax are separated with two muscle named the supscapularis and serratus anterior muscles. Both scabula and thorax can glide over each other during movements of the scapula .The scapula is placed in close approximation to the chest wall by strong muscular attachments. During the movements of the shoulder complex, the scapula can be elevated, depressed, protracted, retracted and rotated in a variable axis perpendicular to its flat surface.

Capsule:

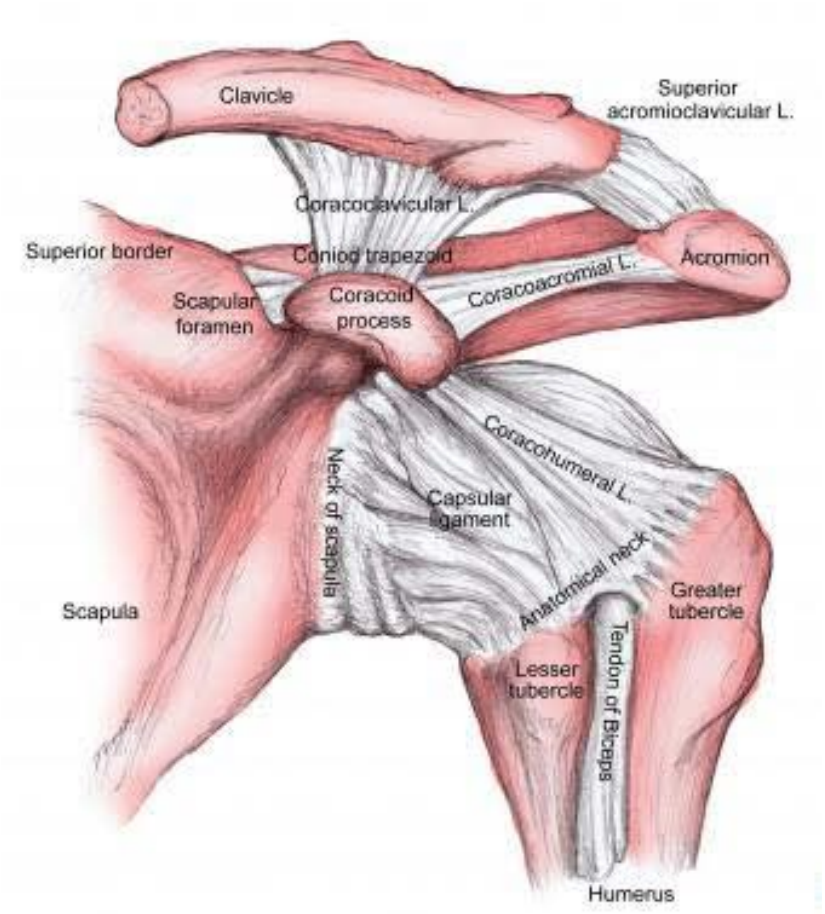


The shoulder joint capsule has attached with the glenoid beyond the labrum. Like in lateral end the capsule has attached with the anatomical neck of humerus ,continuous ½ inch distally in to the shaft of humerus. The shoulder joint capsule has loosely attached and so it allows 2-3 mm distraction while distraction force applied. Because this nature of the capsule it have small contribution in the stability of the shoulder joint. For maintenance of gleno-humeral joint integrity and the shoulder joint capsule nature , the capsule should reinforced with tendon insertion of the rotator cuff muscle and ligaments orientation in the capsule. Along with coraco-humeral ligament the superior part of capsule is very important for maintain stability in upper aspect. Actually it counter the force given by the

gravity in dependent limb. In anterior aspect, the shoulder joint integrity maintained with the help of subscabularis and glenohumeral ligaments . The gleno-humeral ligaments is the major stabilizers in anterior aspect . In posterior aspect, the capsule is strengthened by the infraspinatus and attachment of the teres minor. In inferior aspect the capsule is weaker . The inferior part of capsule undergoes considerable strain when it is stretched by abduction of arm. In adduction position the inferior part of the capsule become fold and loose. These redundant loose capsule undergoes adhesion while inflammation occurs. Kaltsas et al[5] compared the collagen structure of the shoulder elbow and hip joint. When the joint capsules in a mechanical force, the shoulder joint capsule showed a greater resistance to stretch than to rupture. When the capsule was tested for rupture, the structure ruptured antero-inferiorly. Because of the weakness in the inferior part, the shoulder undergoes frequently antero-inferior dislocation. The movement of the shoulder can be influenced by oriention of fibers in the capsule . With the arm on the side of the body, the capsular fibers are oriented with a forward and medial twist. This twist decreases in flexion and increases in abduction. When abduct the shoulder,the capsule becomes taut which causes compression of humeral head against the glenoid fossa. As in further abduction

,because of taut capsule the arms undergoes external rotation. This external rotation of arm causes untwist the capsule and allow further abduction. The external rotation of the humerus while in abduction it may be helped by the configuration of the joint capsule.The capsule has lined with synovial membrane in inner aspect till to its glenoid labrum attachment to humerus. The long head of the biceps travel intra-capsular over the humeral head to the top of glenoid tubercle .The tendon of biceps emerged through the inter-tubercular groove. The tendon has lined with synovial membrane. This synovial covering fascilitate the tendon movements in the joint. The biceps tendon vulnerable to injury ,where it arching over the head of humerus while the bony cortex converted into the articular cartilage.

Extra-capsular ligaments:



Coraco-acromial ligament:

The coraco-acromial ligament orginate from the lateral aspect of coraciod process to upwards and outwards to the tip of acromion process . It combine with outer end of the clavicle and the acromion forms the coraco-acromial roof.

Because of strong coraco-acromial roof ,the rotator cuff tendons runs below the arch and can glide during shoulder movements. The gliding surface of subacromial bursae facilitates the movement of the proximal humerus and its cuff

tendons under this roof. As there is no gab in between the cuff and the roof so the slight amount of upward translation may be compress the rotator cuff tendons or the bursa between the humeral head and the arch. As there is so many changes in coraco-acromial arch and acromion has been proved in rotator cuff injuries. Three types of acromion are described:1) flat 2) curved 3) hooked. There is a relationship between the presence of a hooked acromion and the prevalence of cuff lesions. But hooked acromion and a cuff defect can both be merely the consequences of age also.

Coraco-clavicular ligaments:

There are two

1) Trapezoid
2) Conoid ligaments

The *trapezoid ligament* originates from upper aspect of the coracoid process and attach with the inferior–lateral aspect of the clavicle.

The triangular *conoid ligament* lies medial to the trapezoid ligament. Its origin is at the inner aspect of the superior surface of the coracoid process and it attach at the conoid tubercle at the inferior clavicular aspect. Both ligaments join

together and form a half of a cone. They attach the scapula to the inferior outer side of the clavicle. Their structure allows the clavicle to rotate around its long axis while on elevation of the arm. In this position the clavicular insertion of both ligaments points more or less anteriorly.

Costo-coracoid fascia:

The costo-coracoid fascia is that part of the clavi-pectoral fascia which is situated superomedial to the pectoralis minor muscle. A spontaneous loss of its normal elasticity may end in a contracture of this structure, lead to limite the elevation of the arm.

Bursae:

Subacromial–subdeltoid bursa:

It is important to realize that there is only one bursa here. But, for clinical reasons two portions may be distinguished: a deep, subacromial part and a more superficial part. The former cannot be palpated, the latter can be reached by finger. A good idea of the anatomical localization of this bursa is obtained if the palm of the contra-lateral hand is put on top of the shoulder. The meta-carpophalangeal joints must lie contiguous with the lateral acromial rim. The area

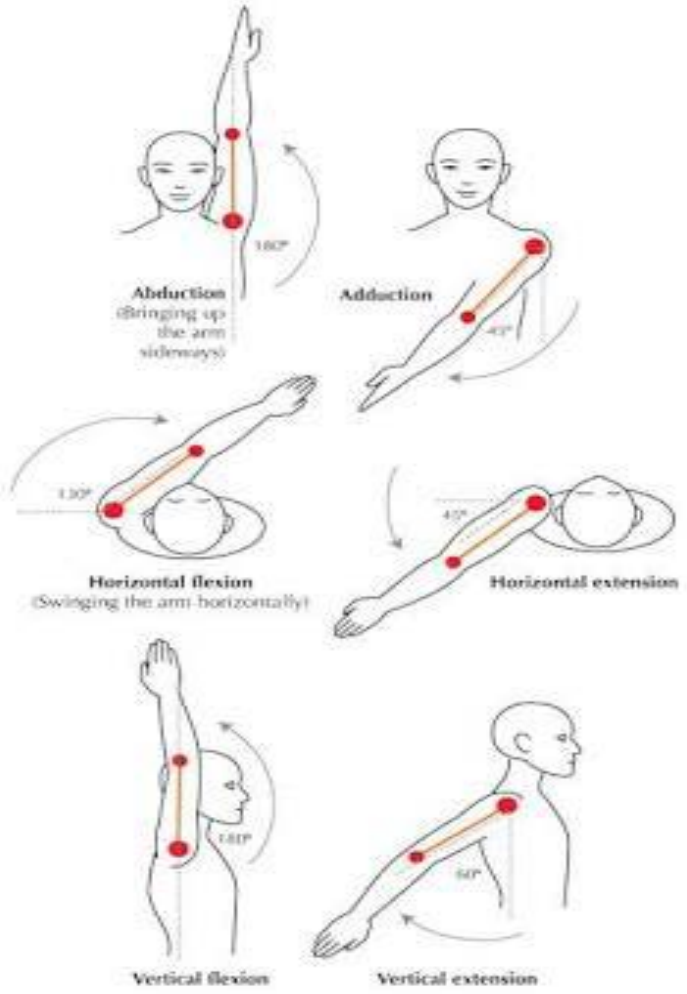
covered by the palm overlies the deep sub-acromial portion of the bursa, the area covered by the fingers, and delineates the superficial sub-deltoid part of it.

The subacromial and subdeltoid bursa is only a potential space. The serosal surface of the coraco-acromial and deltoid can glide with the underserosal surface of deltod muscle. It normally produces a small amount of fluid which acts as a lubricant. The bursa allows these two layers to glide in relation to each other. So it can be considered as the synovial portion of the subacromial joint and as an extension of the gleno-humeral joint. Inflamed, the bursa becomes compromised with inflammation , oedema and adhesions which lead to considerable pain and functional disturbance.

Sub-coracoid bursa:

The sub-corocoid bursae develops between the base of the corocoid process and neck of scapula to the sub-scabularis tendon. The bursa is covered by the pectoralis major muscle. Bursitis here can give rise to an isolated limitation of passive lateral rotation. Since this movement stretches the muscle, it will painfully pinch the inflamed subcoracoid bursa, provoking a spasm of the pectoralis major.

Shoulder movements:



Abduction:

Abduction occurs in the plane of coronal from side of the body to upper level. This movement divided into two parts :

1) True abduction :

In true abduction the arm is elevated from side of body to shoulder level .Among this initial 15 degree has been done by supraspinatous and remaining done by deltoid muscle.

2) Lateral rotation of scapula:

In which raises the arm above the shoulders till it points straight upwards position .It is done by serratus anterior and trapezius.Normal range of abduction varies from 0-180 degrees.

Adduction:

Arm adduction is done by move the arm downwards in the coronal plane till the side of the body .It can divided into two parts :

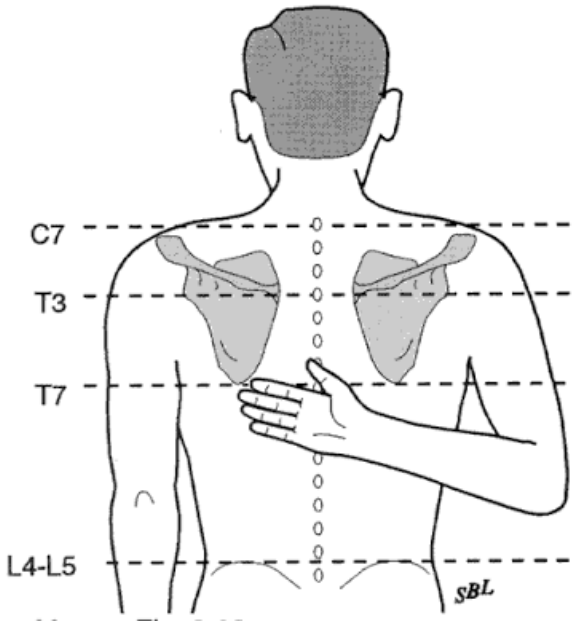
1. Scapular medial rotation :

This is done by pectoralis minor &major muscle, subclavius and latissmus dorsi muscles .

2. True adduction :

True adduction is done by teres major and the deltoid lower muscle fibers. Normal range varies from0-30 degree.

Medial rotation:



Three medial rotators are

1) Teres major 2) latissimus dorsi 3) pectoralis major .

All of these are also adductors. The fourth medial rotator is the subscapularis. Its origin lies in the subscapular fossa, and attach with the minor tuberosity . The teno-periosteal insertion has a 3 cm width and it is very thin. So it cannot be distinguished on palpation. Location of the insertion depends entirely on bony landmarks which is the minor humeral tubercle. On abduction of the arm, the upper fibres pass underneath the acromial roof. Therefore, a momentary impingement of a lesion in this location can happen and produce a painful arc. When we do a horizontal adduction the subscapularis lowest part of insertion in contact with the coracoid process. If a lesion in this portion ultimately provokes pain on this movement. Normal range of medial rotation is 0-70 degrees.

Lateral rotation:

This movement is performed mainly by the infraspinatus and teres minor or the latter being a weak lateral rotator. The infraspinatus orgin from the infraspinal fossa and goes outward underneath the acromion . It attach with the greater tuberosity about 2 cm. The upper fibres have a relationship with the attachment of the supraspinatus . On palpation, the attachment site is flatter and

has a harder consistency than the attachment of the supraspinatus tendon.Normal range of Lateral roatation is 0-90 degrees.

Flexion:

The arm moved in sagital plane in anterior aspect. Main flexors are the pectoralis major, biceps brachii, subscapularis and deltoid muscles. The only other structure that can provoke pain on resisted flexion of the arm is the coraco-brachialis. It originate from the coracoid process associate with the biceps's short head and attach with the medial aspect of the middle of the upper arm, just below the minor tubercular crest.

Normal range of flexion varies from 0-180 degrees.

Extension:

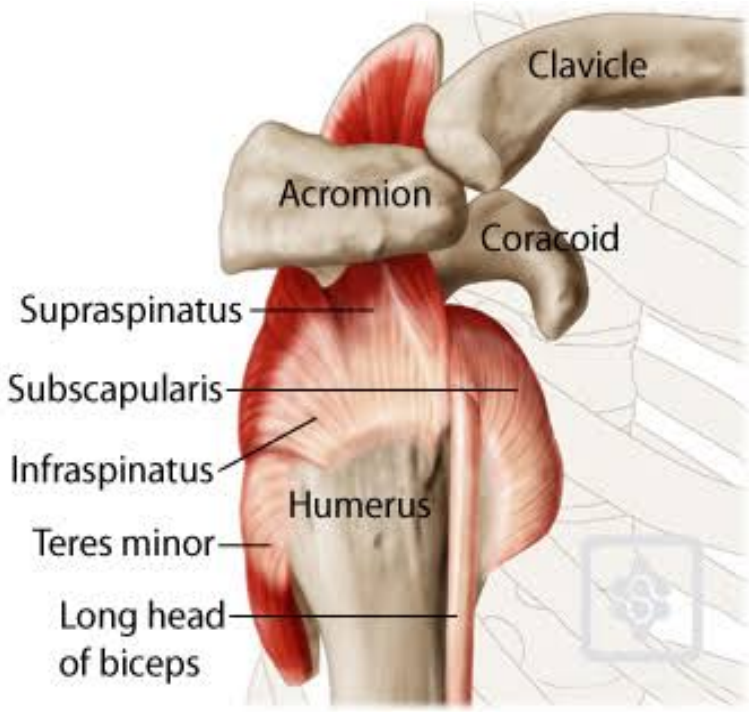
The arm moved in sagital plane away from the body in posterior aspect. It is done by latissmus ,teres major ,long head of triceps and posterior fiber of the deltoid.Normal Range of extension is 0-60 degrees.

Circumduction:

The circular motion the of shoulder in lateral aspect just below to the shoulder level known as circumduction .In this elbow and wrist in extended position .In circumduction ,the humerus is not lifted above to shoulder level so

that circle that is drawn is flattened on top. This movement is by pectoralis major, biceps, subscapularis, deltoid ,latissmus dorsi , coracobrachialis, supraspinatus ,teres major and minor ,infraspinatus and long head of triceps .

Rotator cuff:



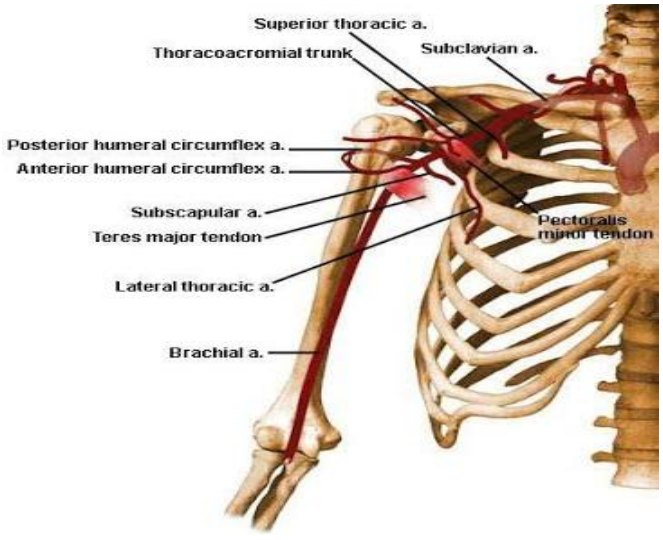
The rotator cuff is a muscle group where all the muscle is originated from scapula and blended with the capsule in various position. This rotator cuff muscle-tendinous group form a ring like insertion with the capsule.In posterior aspect it’s by teres minor and infraspinatus, in superior its by supraspinatus ,in anterior aspect it’s by subscabularis muscle tendon. Eventhough they are seen as separate muscle in superficial plane,but in deeper plane they are plended each other. Their

intimate relationship with each other and with the capsule, together with their unique localization, provides the rotator muscles with some particular functions:

- The rotator cuff muscles rotate the arm with respect to the scapula. The insertion of tendons as a continuous cuff around the humeral head.So, the cuff muscles provides an infinite variety of movements to rotate the arm.
- The rotator cuff muscles when contract with the biceps muscle which gives compression between the glenoid fossa and the humeral head . Which provides locking it into position and providing a secure scapula-humeral link for upper extremity function – which one is concavity-compression .
- They provide muscular balance. There is no fixed axis in the shoulder joint. In a specified position, activation of one muscle will creat a motion in particular axis. To produce a movement in one direction, the other movements initiated by the contracting muscle must be neutralized by other group of muscles. In this rotator cuff muscles are important elements.
- In capsular stability of the joint the rotator cuff muscle is important. Because of the blending of their tendons with the ligaments with the joint capsule, selective contraction of the cuff muscles can adjust the tension in

these structures. So it can produce dynamic ligaments. The tendon of all rotator muscle blends with the shoulder capsule. They provide active support for the joint as dynamic ligaments. Because of the tendon of the long head of the triceps in inferior aspect the capsule is less protected in inferior aspect. So, the rotator cuff a compound musculo-tendinous unit acting as a dynamic component. So, it plays an vital role in movements of the shoulder joint. The basic mechanism of rotator cuff injury related to repeated over activity or overload acvity. When overload has been given to a degenerated tendon, that may lead to rupture. The stress can also tears the articular capsule, resulting in the communication between the joint cavity and the subacromial bursa. Rotator cuff tears result in considerably reduced the amount of elevation of the shoulder joint. The rotator cuff is a routine site for pathological conditions. Usually degenerative and also often in response to fatigue stress. Degeneration may occur even with normal activity levels.

Nerves and blood vessels:



As like other joints the nutrional status of the shoulder joint structure also very important. The shoulder joint mainly nourished by suprascapular artery and posterior circumflex humeral artery. These arteries supply principally teresminor muscle and the infraspinatus areas of the cuff . But sometimes the anterior aspect of cuff and capsule can be supplied by anterior humeral circumflex, subscabular, suprahumeral, thoracoacromial artery also. The supraspinatus muscle is supplied by the thoraco-acromial artery.

Muscles and tendons:

MUSCLE ORIGIN	INSERTION	NERVE SUPPL	ACTION
DELTOID-4septa origin Ant border lat 1/3rd clavicle Acromian lateral border Lower lip crest of spine of scapula	Deltoid tuberosity on humerus	Axillary nerve[c5,6]	Acromial fibres-abductors From90* Anterior fibres-flexors and medial rotators Posterior fibres-extensors and lateral rotators
SUPRASPINATUS-medial2/3 Of supraspinatus fossa	Greater tubercle upperimpresi	Suprascapular nerve[c5,6]	Initiator of abduction0*15* steadies humeralhead
INFRASPINATUS-medial2/3 of infraspinatus fossa	Greater tubercle	Suprascapular nerve[c5,6]	Lateral rotator of arm
TERES MINOR-Upper2/3 of dorsal surface of scapula	Greater tubercle	Axillary nerve[c5,6]	Lateral rotator of arm
SUBSCAPULARIS-medial 2/3 of subscapular fossa	Lesser tubercle	Upper ,lower subscapular N	Medial rotator and adductor of arm
BICEPS- Short head-tip of coracoid Long head-supraglenoid	Radial tuberosity of posteriorly	Musculocutaneous nerve[c5,6]	Strong supinator when forearm flexed Flexor of elbow Short head-arm flexor Long head-prevents upward displacement

MUSCLE ORIGIN	INSERTION	NERVE SUPPLY	ACTION
PECTORALIS MAJOR Ant surface of clavicl Ant manubrium[ant lamina] 2nd-6th coastal cartilage External oblique abdominus aponeurosis[post lamin]	Bilaminar tendon on lateral lip.two lamina are continous Fibres from sternum and aponeurosis are twisted and inserted	Medial and lateral pectoral nerve	Adduction and medial rotation of shoulder Clavicular-arm flexor Sternoclavicular part-extension of flexed arm against resistance
LATTISMUS DORSI- Outer lip of iliac crest post 1/3rd Posterior layer of lumbar fascia T7-12 spinous process Lower 4ribs Inf angle scapula	Winds round lower border of teres major and forms posterior axillary fold Tendon is twisted upside down insert into intertubercular sulcus of humerus	Thoracodorsal nerve[c6,7,8]	Adduction,extension, medial rotation of shoulder Helps in voilent expiratory effort Climbing muscle Holds inferior angle of scapula in place
TERES MAJOR- Lower 1/3rd of dorsal surface of lateral and inferior angle scapula	Medial lip of bicipital groove	Lower subscapular nerve[c5,6]	Medial rotator and adductor arm

PRINCIPLE MUSCLES ACTING ON SHOULDER

MOVEMENTS	MAIN MUSCLE	ACCESSORY MUSCLE
FLEXION 0-135*	PECTORALISMAJOR(clavicular part) DELTOID ant fibres	Coracobrachialis Biceps short head
EXTENSION 45-60*	DELTOID post fibres LATISSMUS DORSI	Teres major Triceps long head P major[sternocoastal head]
ADDUCTION	PECTORALIS MAJOR LATISSMUS DORSI BICEPS long head TRICEPS short head	Teres major coracobrachialis
ABDUCTION	SUPRASPINATUS[0-15*] DELTOID[15*-90*] SERRATUS ANTERIOR[90*-180*] TRAPEZOIDupper,lower fibres[90-180]	
MEDIAL ROTATION [INTERNAL] 90*	PECTORALIS MAJOR DELTOID ant fibres LATISSMUS DORSI TERES MAJOR	subscapularis
LATERAL ROTATION [EXTERNAL] 70*-90*	DELTOID posterior fibres INFRASPINATUS TERES MINOR	

MUSCLE ORIGIN	INSERTION	NERVE	ACTION
LEVATOR SCAPULA-Transverse process of c1,2 Posterior tubercles of transverse process of c3,4	Superior angle and upper part of medial border of scapula	Branch of dorsal scapular nerve[c5]	Elevation of scapula Steadies scapula during arm movements

ETIOLOGY

Even though considerable research in the last century,the pathology and etiology of frozen shoulder remain enigmatic. The prevalence is approximately[6] 2-5% of adults in general population. It seems to develop between the ages of 40 to 60[7]. Without any predisposing condition adhesive capsulitis rarely occur in the same shoulder. Normally non dominant hand is most commonly involved .The prevalence seems to be equal between both sexes. Adhesive capsulitis commonly presents as unilateral pathology. There is a chance of 20%[8] incidence as bilateral shoulder. In diabetic[9] prevalence is 20%.It is the most common disabling condition of the musculoskeletal manifestations in diabetes. Other associated problem other than diabetes are cardiac problems, lipid disorders,epilepsy,endocrine problems like hypothyroidsm and trauma.

PATHOLOGY

Generally three pathological condition:

- An inflammatory process(simmonds 1949,wiley 1991,Hannafin et al 1994)[10]

- An fibrotic process[11](Ozaki et al 1989, Bunker and Anthony 1995, Hannafin and Chiaia 2000) and
- An inflammatory process with subsequent reactive capsular fibrosis[12] (Bunker et al 2000)

In1872[13] Duplay theorized that the pathologiuc condition of frozen shoulder was found in subacromial bursae but later codman[14] (1934) related the disorder to calcific tendonitis. In 1945 Neviaser[15] discover a tight, thickened capsule that adhered to the humeral head. Neviaser described an inflammatory reaction that led to adhesion, specifically in the axillary fold and in attachment of the capsule at the anatomic neck of humerus . In histological and biobsy examination, he found perivascular infiltration, capsular thickening contracture and fibrosis. He proposed that the pathology primarily involved the shoulder capsule, coin the name 'Adhesive capsulitis' as better name for the disease. However in 1969 Lunberg[16],in 1991 Wiley and in 1994 bunker et al found in their arthrocopic studies no adhesion in adhesive capsulitis.

NATURAL HISTORY:

The natural history of adhesive capsulitis has three stages. Normally the duration of disease varies 2-3 years. Some of adhesive capsulitis resolved spontaneously after this course.

Stages:

1) Freezing stage:

Started with dull aching pain around the shoulder. Normally it varies from 3-4 months.

2) Frozen stage:

Severe pain associated with marked stiffness seen in this stage.This lasts for approximately 4-9 months.

3) Thawing stage:

It is usually painless stage and stiffness gradually start to resolve in this stage. It lasts for 9-18 months.After most cases it resolved spontaneously.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

1. Christopher Munro et al(17) among 25 adhesive capsulitis arthroscopic capsular release,It is clear that from the results that surgical intervention by way of arthroscopic capsular release is effective at improving shoulder function in patients with primary frozen shoulder as early as four weeks post-operatively. The change in OSscore was statistically significant. The safety of this procedure is also shown favourably with there being no surgical complications.

2. Berghs et al[20] arthroscopic capsular release in 25 adhesive capsulitis case with 14.8 months follow up results yields rapid recovery in all patients.

3. In a study of **jerosch *et al*** (2012)[21] 173 shoulders were treated with arthroscopic capsular release. In only one case a relevant complication was reported .

4. In study by **LeLievre and Murrell** (2012)[22] arthroscopic capsular release was performed in 49 shoulders .no intraoperative, postoperative or long-term complications occurred .

5. Marina walther et al (2014)[23] 14 of 15 patients in adhesive capsulitis has achieved an improvement of their ranges of movement.

6. Mohammad H Ebrahimzadehe et al(2014)[24] among 80patients with adhesive capsulitis, arthroscopic release of recalcitrant frozen shoulders is a valuable technique,which could decrease pain and improve both subjective and objective outcomes in mid-term period of time.

HISTORY

In 1912, Danish surgeon from Aarhus named SeverinNordentoft constructed an endoscope and reported that it could be used for endoscopy of the knee joint and coined the term 'ARTHROSCOPY'. He was considered as first arthroscopist.

Severin Nordentoft (1866-1922)

MATERIALS AND METHODS

MATERIAL AND METHODS

The present study was carried out in the Government Royapettah Hospital (GRH), Kilpauk Medical College from May 2013 to September 2015. The study consists of total 17 patients of adhesive capsulitis satisfying the inclusion criteria, who are treated with Arthroscopic Release. It was a PROSPECTIVE STUDY.

AIM OF STUDY:

1. To assess the early functional outcome of arthroscopic stiff shoulder release in adhesive capsulitis patients.
2. Study the associated comorbidities with adhesive capsulitis, mean time of recovery.

The adhesive capsulitis were treated with Arthroscopic Capsular Release and intensive Physiotherapy followed by Home Exercise.

DATA COLLECTION:

In all the patients, the personal data, age of onset, intra operative & post operative complications, follow up shoulder joint examinations, painless range of movement were considered.

Instruments and Implants:

ARTHROSCOPE:

Arthroscopy is a optical system with three basic variety in rigid arthroscope

They are

(1) Graded index lens system (GRIN),

(2) Rod-lens system.

(3) Classic thin lens system.

Optical characteristics of arthroscope depends on diameter of scope ,degree of inclination angle , and field of view .The inclination angle is the angle between a line drawn perpendicular to the surface of the lens and the axis of the arthroscope. It is from 0 degree to 120 degrees. Most commonly the 25 and 30 degree arthroscopes has been used .When we use the 70 degree and 90 degree we can clearly see the corners . In field view refers to the viewing angle covered by the lens which has been used . It depends according to the type of arthroscope.

If the 1.9 mm scope is used, it has a 65-degree view field. Like if the 2.7 mm scope, a 90-degree view field and for the 4.0 mm scope a 115 degree view field . Surgeons most comfortable with wider viewing angles which give in wide view field. Arthroscope vary in diameter from 1.7 to 7 mm. among this 4 mm is the most common used size.

Fibre optic light source:

Most commonly used light source are tungsten, halogen, and xenon arc. The light source that produce 300 to 350 watts power. The light passed through the arthroscope connected to television system for viewing interior structure.

The fiberoptic cable consists of a bundle of glass fibers which enclosed in a sheath for protection. One end of the fibre optic cable is attached to a light source that is remote from the operative field and the other end is attached to the arthroscope .The arthroscope is also lined with glass of fibers.

Television systems:

The television camera was first introduced to the arthroscopy system by Mcginty and johnson. The television system gives more comfortable to operating

surgeon and also the contamination of the operative field by the surgical team in the procedure can be avoided.

Probe :

The probe is considered as the extension of the arthroscopist's finger.It has been used in almost all arthroscopic procedures. It almost safest instrument among arthroscopic instruments . By using probe we can feel the consistency of a structure, like the articular cartilage and other intra-articular structures and pathology. Most probes are curved in right angle with 3 to 4mm tip lenth .So it can use for the measure of the intra articular leison.

Motorized shaving system:

The motorized shaving system have two tubes among this outer one is hollow sheath which contain the inner rotating canula.The outer covering sheath have adequate diameter to allow the inner cannula to rotate. The inner sheath has two functions:

1) Within the outer hollow tube cylindrical blade that spins inside.

2) Suction of fragments and depris materials with water through inner hollow tube cylindrical.

Equipment setup:

A tower containing a television, light source, shaver power ,video recorder and irrigation pump is placed opposite the surgeon .A Mayo stand is placed opposite to operating surgeon which contains the basic equipements.

basic equipements

instruments

shoulder pumb

Inclusion Criteria:

1. Painful, restricted active and passive range of motion of the shoulder.
2. Age above 18 years.
3. An absence of radiological evidence of glenohumeral joint arthritis and other intra-articular pathologies.

Exclusion Criteria:

1. Age below 18 years.
2. History of neuromuscular disease
3. Prior shoulder surgeries
4. Shoulder symptoms due to other causes.

Data Collection:

A proforma was prepared and all the details of patient were entered in that proforma after admission. Patient discharged after completion of the treatment and called for follow up at regular interval of 2 weeks, 1 month, 6 month. At each visit range of movement in shoulder flexion, extension abduction, adduction,

shoulder external rotation and internal rotation in degrees were measured and entered in that proforma.

Management of patient:

All stiff shoulder patients were admitted in arthroscopic and sports injury ward. Those found eligible were included in study. Patients were also evaluated for associated medical problem and opinions were obtained from respective departments and necessary treatments were given. After getting anesthetic fitness, all patients were operated electively.

Pre operative planning:

Patient position:

Lateral decubitus position:

The patient must be placed on a beanbag or other stabilizing device, with all bony prominences padded. The patient's torso is rolled posterior 25 to 30 degrees to position the glenoid parallel to the floor . This also opens up the joint and facilitates access into the shoulder joint with the arthroscope. The arm is placed in a foam traction sleeve and connected to the traction device . It is positioned in 45 degrees of abduction and 15 degrees of forward flexion. This arm

position is adequate for visualization of both the glenohumeral joint and the subacromial space.

Lateral decubitus position

INTERSCALENE NERVE BLOCK TECHNIQUE:

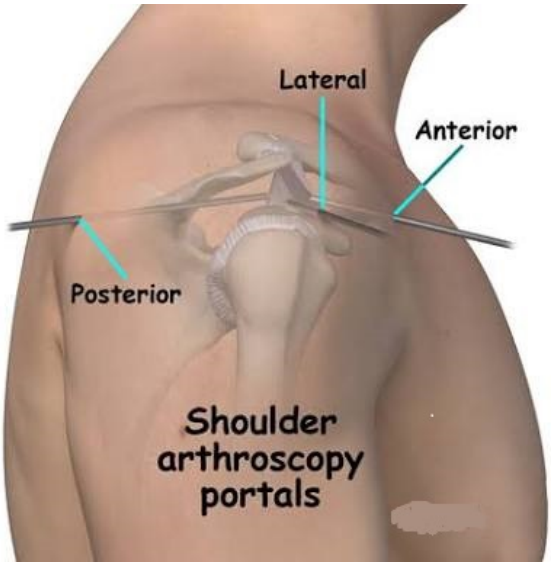
Patient in supine position head rotated to contralateral side about 30 deg, palpate the interscalene groove between the anterior and middle scalene muscle. Nerve catheter placed with the help of usg or blind technique. Roots C5-C7 most densly blocked,C8-T1 Roots may spared. Infusion 0.125% bupivacaine at 5ml/ hour was infused with help of epidural pump after surgical procedure for pain relief.

Interscalene Nerve Block Technique

Surgical Technique:

All surgeries were performed under GA in supine position. In the absence of any cardiovascular contraindications, we used 1mL of 1:1000 epinephrine dissolved in 3 L of 0.9% of normal saline to decrease the bleeding.

Portals:

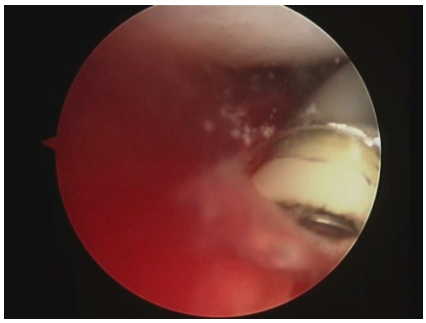


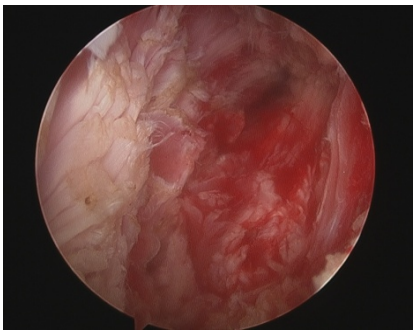
First we created the posterior portal, which was subsequently followed by the anterior portal through rotator interval to remove synovium and release contractures.

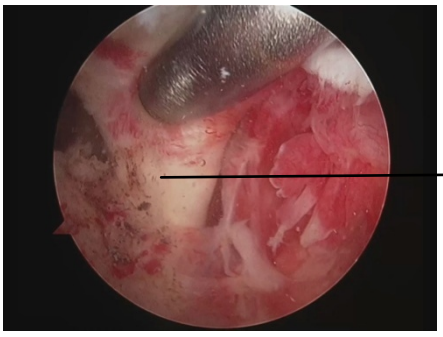
At this stage, by using a coblation probe, we released the rotator interval triangle contractures. All capsular ligaments, including coracohumeral ligament,

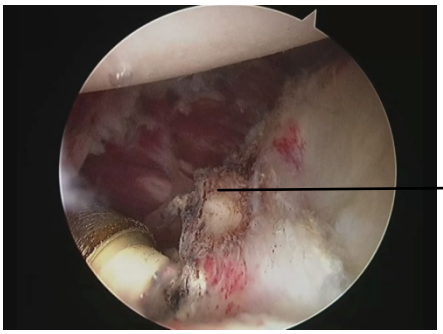
anterior capsule, superior, anterior, and anterior-inferior capsule glenohumeral ligaments, the inferior capsule pouch, and posterior inferior capsule were released. The thickened part of coracohumeral ligament should explore and release which is possible after opening the rotator interval and exposing lateral surface of coracoid process. After release we manipulate the shoulder in all directions gently. At the end of the operation, 10mL of depomedral was injected in to the joint.

Intra operative picture:

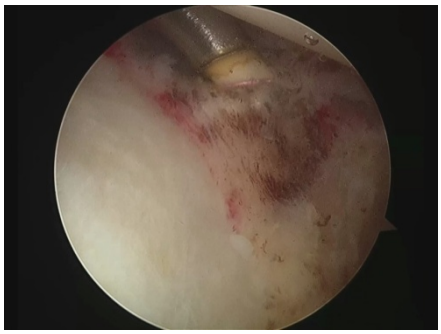








Capsule release



Post operative protocol:

Interscalene catheter nerve block

Post operatively patient's blood pressure, pulse, respiration and temperature were monitored. Arm is kept elevated on day of surgery. Intravenous antibiotics were given for five days followed by oral antibiotics till suture removal. Suture removed on 12^{th} day. Patient was made to sit in the bed on first POD. Passive shoulder mobilization exercise were started immediately with the help of continuous interscalenaus nerve block.

Discharge:

Patient was discharged from the hospital after seven days with satisfied ROM and portal wound status. Advise to continue home exercise.

Follow up:

After discharge patient was asked to come for regular follow up at 2 weeks, 1 month, 2 month and every month till full recovery. Data entered for pre-op, post op,1month,6month.

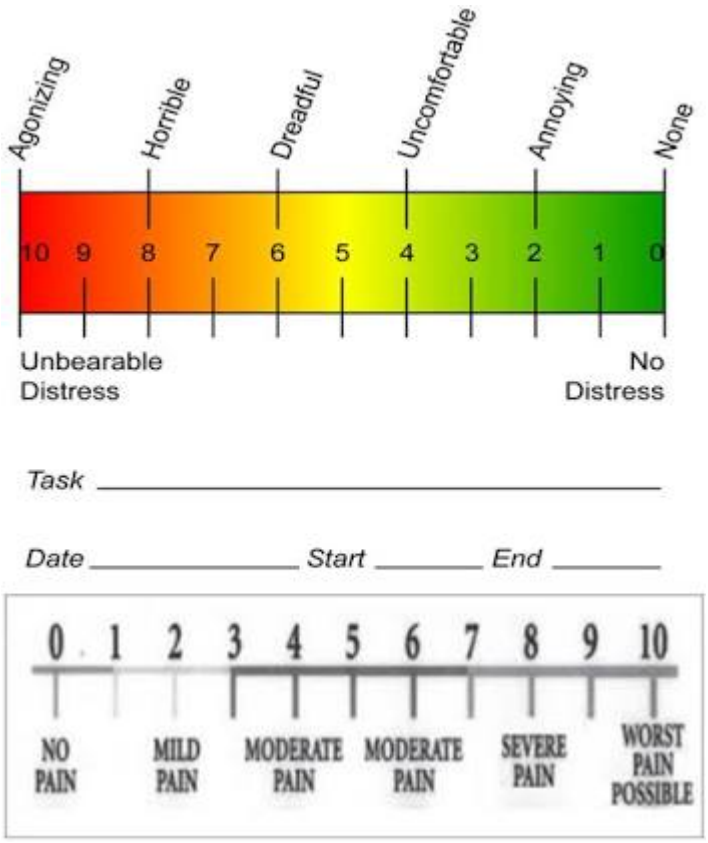
SCORING SYSTEM:

We use the follow scoring system to assess the functional status of patient

UCLA score

Criteria		Finding	Score	Patient score
1)	Pain	Constant,Unbearable,Strong medication		
		Frequently	1	
		Constant,but bearable,strong medication		
		Occasionally	2	
		None or little at rest,occurs with light activities		
		Salicylate frequently	4	10
		With heavy or particular activities only,		
		Salicylate occasionally	5	
		Occasional and slight	8	
		No pain	10	
2)	Function			
		Unable to use arm	1	
		Very slight activities only	2	
		Light house work or most daily living activities	4	
		Most house work,was hing hssair, putting on brassiere		10
		Shoping, driving	5	
		Slight restriction only, able to work above shoulder		
		Level	8	
		Normal activities	10	
3)	Muscle power	and motion		
		Ankylosis with deformity	1	
		Ankylosis with good functional position	2	
		Muscle power poor to fair,elevation <60°,		
		internal rotation<45°	4	10
		Muscle power fair to good,elevation 90°,IR:90°	5	
		Muscle power good to normal,elevation 40°,ER 20°	8	
		Normal muscle power,Motion near normal	10	
		>8=excellent,>6=good,>4=fair,>/=3-poor		

VAS score system:



OBSERVATION AND RESULTS

OBSERVATIONS AND RESULTS

The following observations were made from the data collected during this study in the department of Orthopaedics, Government Royapettah Hospital, Kilpauk Medical College from May 2014 to September 2015.

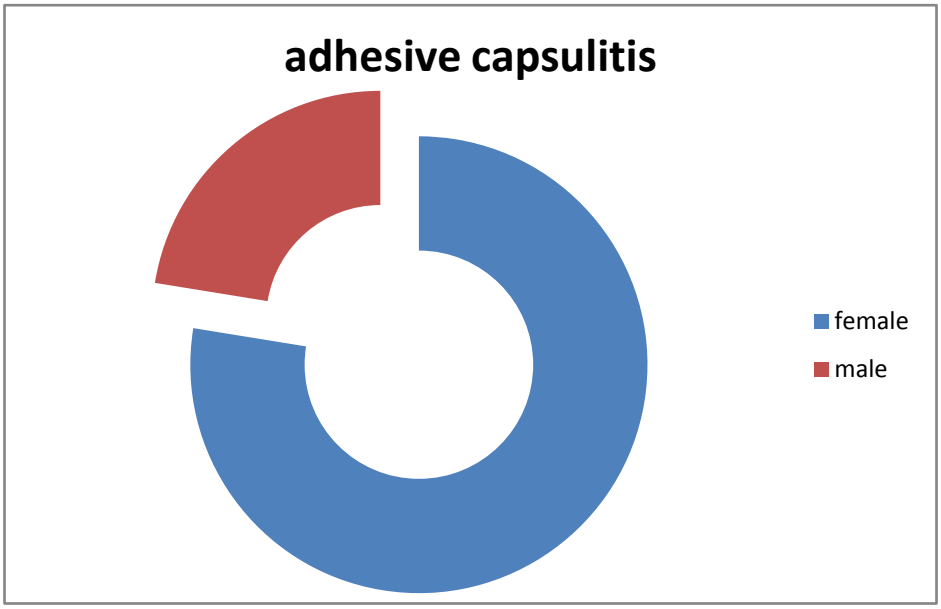
Table 1

Age wise distributions of patients

Age Group	No. of Patients	Total %
40 to45	2	11.7
46-50	2	11.7
51-55	6	35.2
56-60	1	5.8
61-65	5	29.4
66-70	1	5.8

In my study the most common age group of involvement is51-55 years.

Sex Wise Distributions of Cases



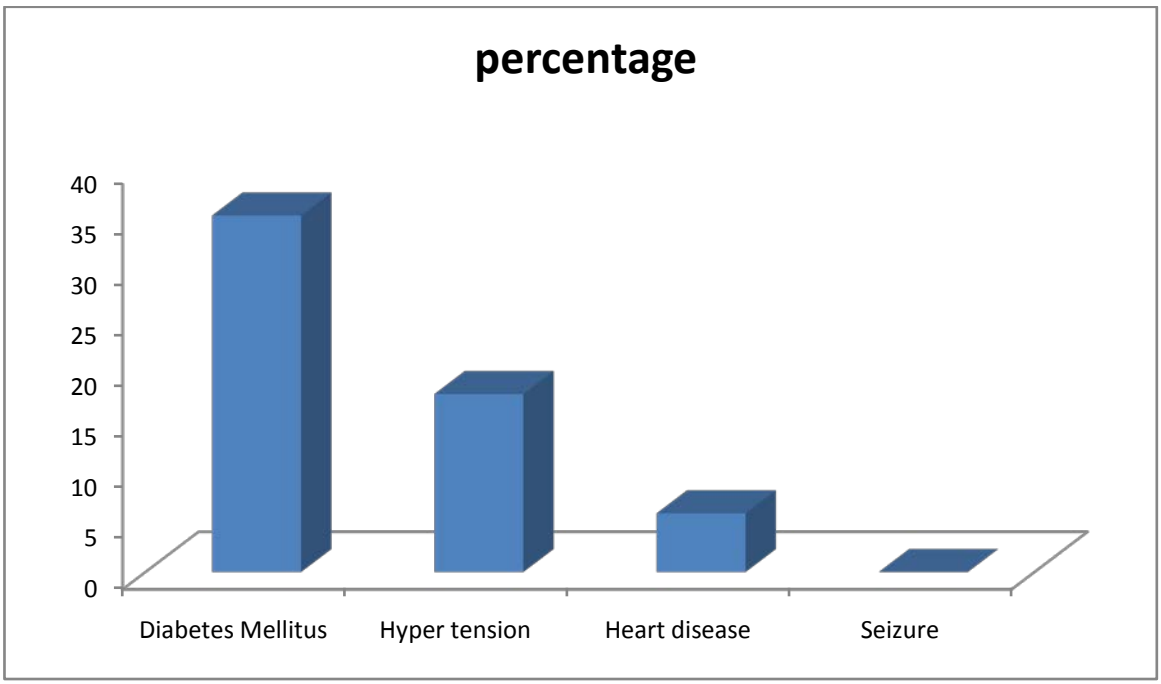
Among both sex ,70.5% females are affected. It clearly indicates females are most commonly affected.

Table 3

Patient Comorbidities associated with adhesive capsulitis

Comorbidities	**No. of Patients**	**Percent (%)**
Diabetes Mellitus	6	35.2
Hyper tension	3	17.6
Heart disease	1	5.8
Seizure	0	0

Patient Comorbidities associated with adhesive capsulitis



The table shows adhesive capsulitis most commonly associated withi diabetic patients.

Table 4

Baseline characteristics of diabetic and

Non-diabetic patient suffering from adhesive capsulitis

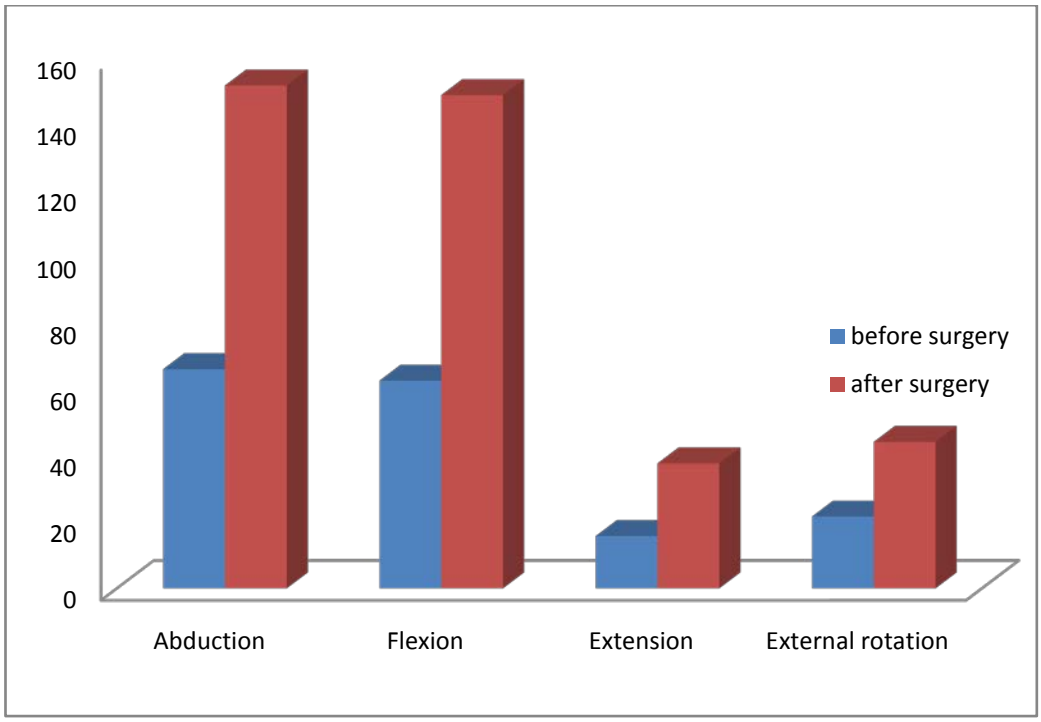
Variables	**Diabetics**	**Non-diabetics**
Number	7	10
Age in year	55.1	54.3
Affected side	Left	Right
Duration of symptoms before operation(months)	11.4	4.8
No. Of pain hours after surgery in daily activities	2	2

Table 5

Comparison of shoulder range of motion before and after arthroscopic release

Range of motion (average)	**Before surgery**	**After surgery**
Abduction	***66.1***	***151.7***
Flexion	***62.6***	***148.8***
Extension	***15.8***	***37.6***
External rotation	***21.7***	***44.1***

Comparison of shoulder range of motion before and after arthroscopic release



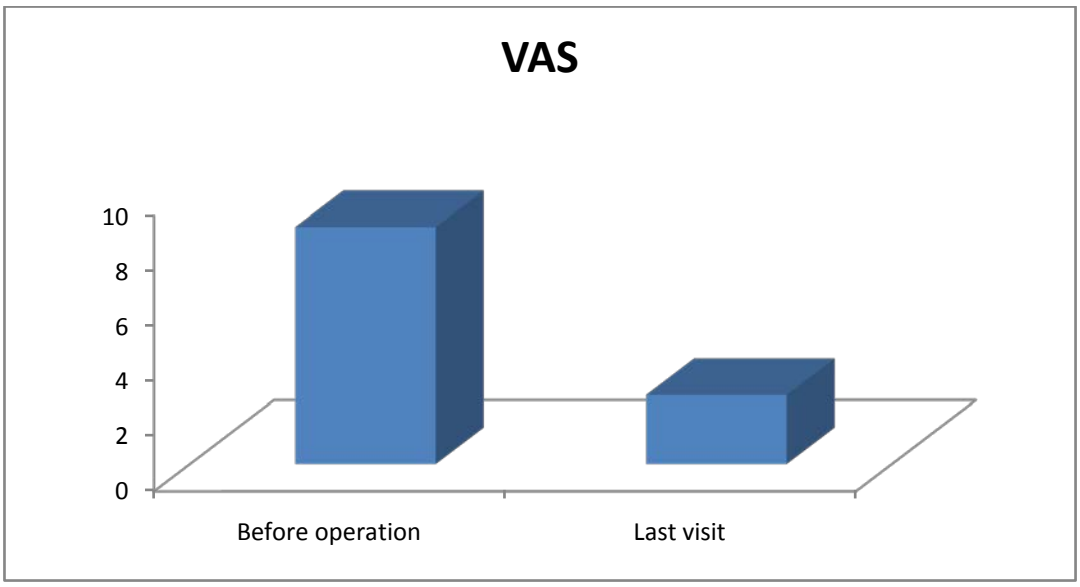
The table and chart clearly indicates significant improvement in range of movement after arthroscopic capsular release.

Table 6

Clinical outcome of patient treated for adhesive capsulitis

	VAS-score
Before operation	***8.6***
Last visit	***2.5***

Clinical outcome of patient treated for adhesive capsulitis



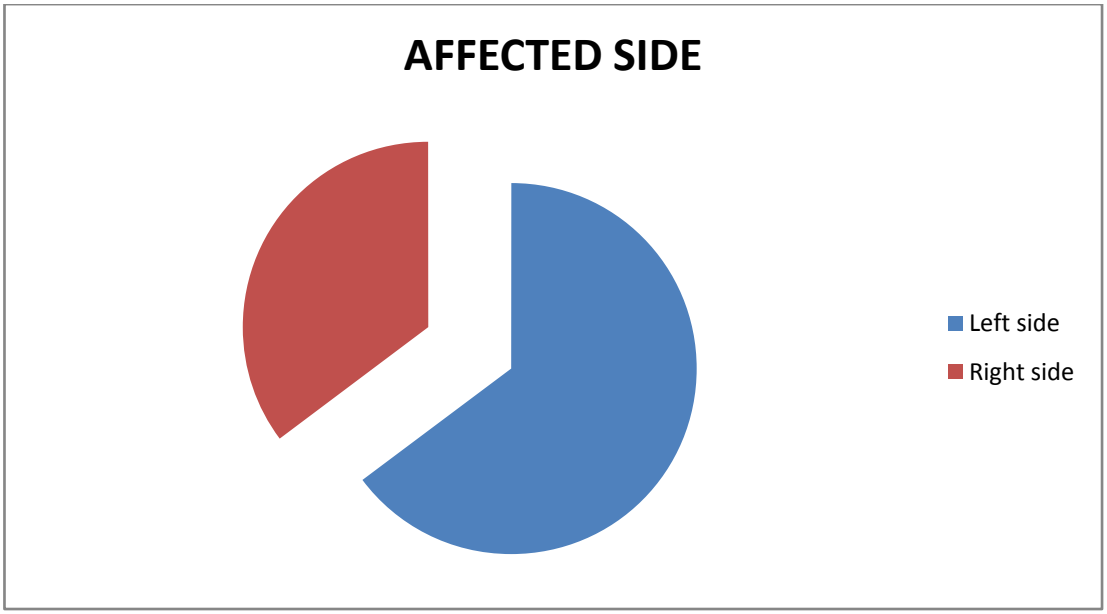
The vas score status denotes significant improvement in pain after surgery.

Table7

Affected side among adhesive capsulitis cases

Side	No of patients	Percentage
Left side	11	64.7
Right side	6	35.2

Affected side among adhesive capsulitis cases

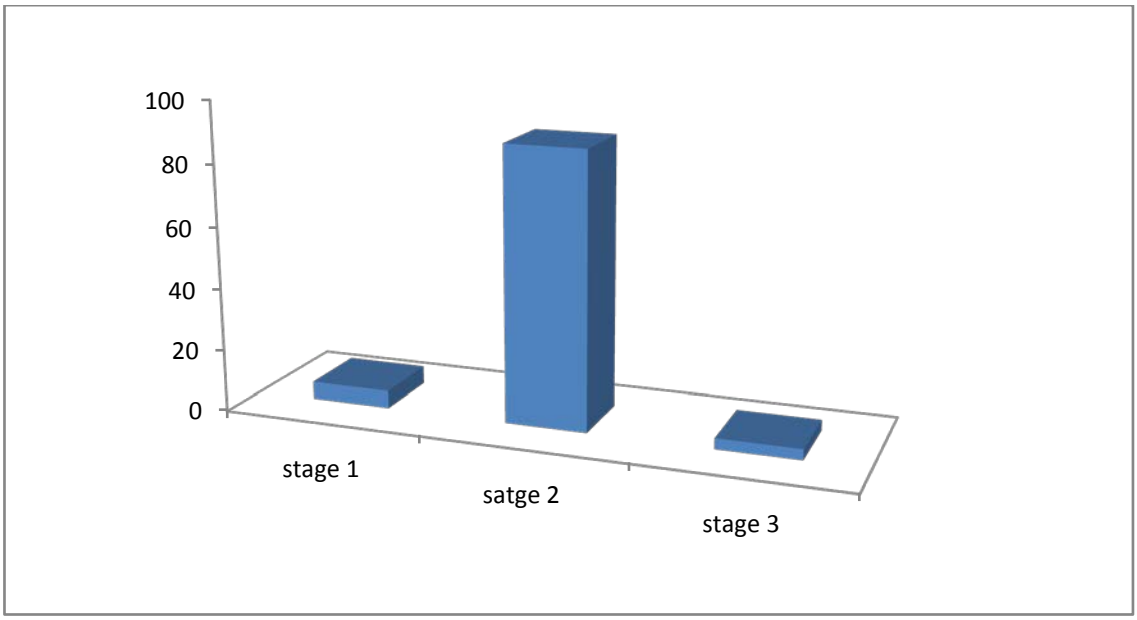


In our study ,left side shoulder involved commonly when compared with right side.

Table 8 Comparision stage of disease at the time of operation

Stage of diseaese	*Percentage of patients*
Stage 1	*5.8*
Stage 2	*88.6*
Stage 3	*5.8*
total	*100*

Comparision stage of disease at the time of operation



Most common stage in our study is stage 2.

CASE ILLUSTRATIONS:

Case 1

Flexion

Extension

Abduction

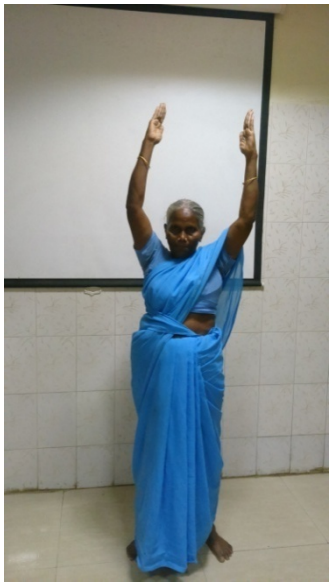
Adduction

Externalrotation

Internalrotation

After surgery 1month follow up

Portal scar



Abduction

Adduction

Flexion

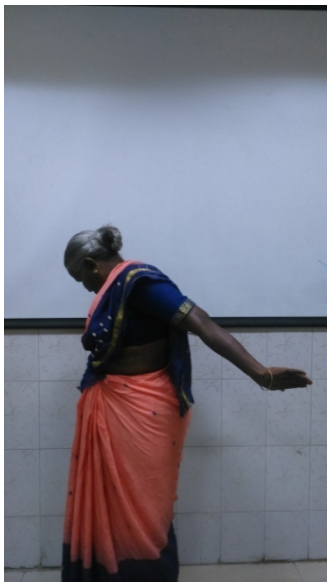
Extension

Internalrotation

Abduction

Adduction

Flexion



Extension

Internalroation

Externalrotation

Case 2:

Abduction

Adduction

Flexion

Extension

Internalrotation

1month follow up:

Abduction

Adduction

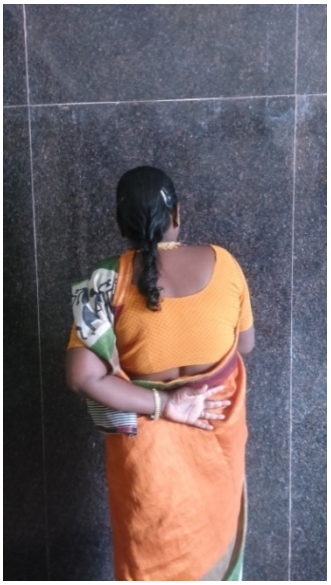
Flexion

Internalrotation

Abduction

Adduction

Extension

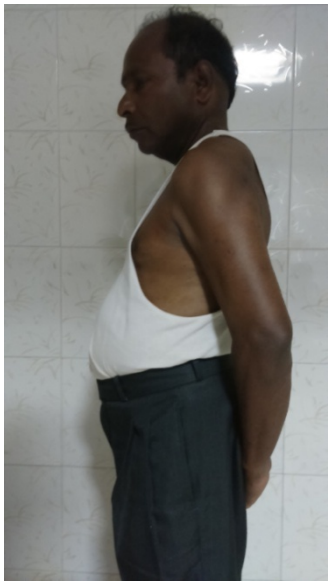


Internalroation

Externalrotation

Case 3:

Flexion



Extension

Abduction

Internalrotation

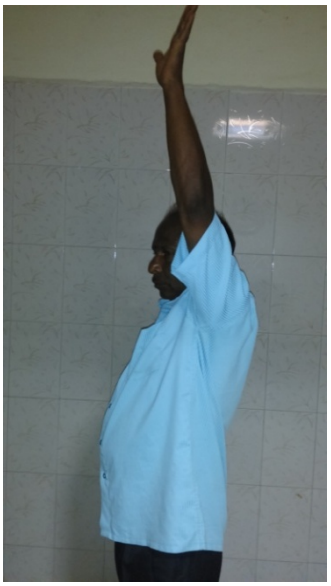
Externalrotation

1month follow up:

Abduction

Adduction

Internalrotation



Flexion

Extension

Externalrotation

6month follow up:

Abduction

Adduction

Flexion

Extension

Externalrotation

Case 4:

Flexion

Extension

Abduction

Adduction

Externalrotation

Internalrotation

1month follow up:

Portal Scar

Flexion

Extension

Abduction

Adduction

.

Internalrotation

6 months follow up:

Flexion

Extension

Abduction

Adduction

Internalrotation

DISCUSSION

DISCUSSION

In our study, most of the patients with adhesive capsulitis were female with the mean age of 51.5 years old. Left shoulder was affected more frequently than the right side. Almost 35.2% of patients suffered from diabetes mellitus. All of the patients recovered from pain and achieved their highest range of motion at mean time of 6 weeks. Shoulder range of motion and clinical outcomes improved significantly it clearly seen by pre and post-operation score .pre-operative mean vas score is 8.6 and after surgery it is 2.5. Average of gained movement is >50% in all patients when compared with preoperative range of movements. In our study group 99% has come with excellent to fare outcome. Among these 58.8% patients scored excellent functional outcome, 23.5% scored good functional outcome and 17.6% scored fair functional outcome, no patients had poor functional outcome according to UCLA scoring system. Before surgery the average VAS score 8.6 After surgey it was reduced to 2.5. The average age of patient suffering from adhesive capsulitis of shoulder were 54 and 50 in studies by Musil et al[27] and Cinaret al[28] respectively. Similar to our result, Sheridan et al[29], reported more involvement in women compared to men. Manibulation under anaesthesia has been effective but doesn't allow controlled release of pathology

with risk of humeral fracture.[25]The thickened part of coracohumeral ligament should explore and release which is possible after opening the rotator interval and exposing lateral surface of coracoids process by arthroscopy. It's important for restore the external rotation and relief pain.[26] While we release the inferior capsule we should be careful and release very close to glenoid edge because axillary nerve lies close to it[31].There is no recurrence in our follow up. Marina walther et al[30] Arthroscopic capsular release, alone or with subacromial decompression, is a safe procedure and showed the best results postoperatively.

LIMITATION:

Limitation of our study are,

1) small no sample group,
2) no randomization,
3) lack of controls.

CONCLUSION

CONCLUSION

1. Adhesive capsulitis most commonly encountered in our study between 51-55 age groups
2. In Indian population also most commonly seen in females with non dominant hand commonly affected.
3. In our study most common associated co-morbidity is diabetes mellitus followed by hypertension .The correlation between adhesive capsulitis and hypertension needs large control studies.
4. Continuous interscalenaus catheter nerve block gives adequate analgesia for active and passive shoulder mobilization which is necessary for mobile painless shoulder joint.
5. Mean time of recovery after arthroscopic release is 6 weeks in our study
6. In our study the Arthroscopic capsular release is a safe procedure and showed the best results postoperatively.

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MASTER CHART

MASTER CHART

Sl. No	Sex	Age	AOS	SOD	SOL	Pop score	Pop vas	Poprom $fl^{o}/abd^{o}/er^{o}$	Dos (month)	Complication	Duration Of isb (days)	Popvass core	Post of score	Post of $romfl^{o}/abd^{o}/er^{0}$	Co-morbidities	Mean Time of recovery (month)
1.	F	49	48	Ii	L	7	9	30/30/10	5	-	7	2	18	100/110/30	Dm5yr	2
2.	M	63	62	Ii	R	10	9	40/40/10	12	-	7	4	21	170/160/30	Dm	2
3.	F	65	65	Ii	L	11	9	90/100/20	3	-	7	2	21	160/170/40	Asthma, ht	1
4.	F	51	51	Ii	L	12	8	80/90/30	5	-	7	2	24	160/170/50	-	1
5.	M	54	53	Ii	R	9	9	60/50/30	1	Portal pain	4	4	24	180/170/50	Dm	1
6.	F	55	55	Ii	L	10	9	40/40/20	3	Portal pain	7	3	18	100/120/50	-	3wks
7.	F	62	62	Ii	R	10	8	60/70/30	4	-	7	2	24	160/160/60	-	1
8.	M	67	67	Ii	L	7	9	30/40/10	4	-	14	2	18	110/110/40	Dm	1
9.	M	64	61	Ii	L	10	9	50/40/10	36	-	14	2	21	140/130/40	Dm, ht, cad	1
10.	F	50	50	Ii	L	10	9	40/50/10	6	-	7	2	24	150/160/30	Dm	2
11.	F	45	45	Ii	L	14	9	80/90/30	3	-	6	1	24	160/170/50	-	1
12.	F	55	55	Iii	R	17	7	90/100/40	3	-	7	2	24	160/170/50	-	1
13.	F	45	45	Ii	L	10	8	40/50/10	5	-	10	3	24	170/160/30	Dm	2
14.	F	59	58	Ii	L	10	8	40/50/20	12	-	7	3	21	160/150/50	Ht	2
15.	F	65	64	Ii	R	13	8	90/90/30	8	-	10	3	24	160/170/50	-	2
16.	F	43	43	Ii	L	14	7	100/90/30	4	-	10	3	24	170/160/50	-	1
1 7.	F	42	42	I	R	14	7	100/100/30	3	-	7	3	24	160/160/50	-	1

MASTER CHART TO KEY NOTE

AOS	-	Age of Onset of symptoms
SOD	-	Stage of Diseases
SOL	-	Side of Limb affected
POP Score	-	Pre Operative Score
POP VAS	-	Pre Operative Vas score
POP ROM	-	Pre Opreative Range of Movement
DOS	-	Duration of Symptoms
ISB	-	Inter Scelenes Nerve Block

PROFORMA

PROFORMA

"AN EARLY FUNCTIONAL OUTCOME ANALYSIS OF ARTHROSCOPIC STIFF SHOULDER RELEASE IN ADHESIVE CAPSULITIS"

Patient's Name :

Age:

Sex:

Occupation:

Address:

Contact no:

I.P.No:

Duration of symptoms:

Side of upper Limb Involvement:

Comorbid conditions:

Date of admission:

Investigations : Complete haemogram ,
Blood urea,sugar,Sr.Creatinine
Bleeding time and clotting time
ECG
Chest X-ray
Plain X-ray AP view of affected shoulder

Diagnosis:

Treatment:

Date of surgery :

Intra-operative complication:

Post operative complications :

Post operative shoulder mobilization started at :

Duration inter scalenes Nerve Block:

Follow up: evaluated with AP view of affected shoulder

Immediate post op
4 weeks post op
8 weeks post op
3 months post op
6 months post op

Functional assessment using criteria: graded as excellent, good, fair and poor.

INSTITUTIONAL ETHICAL COMMITTEE
GOVT.KILPAUK MEDICAL COLLEGE,
CHENNAI-10
Protocol ID. No.6/05/2015 Meeting held on 07/05/2015
CERTIFICATE OF APPROVAL

The Institutional Ethical Committee of Govt. Kilpauk Medical College, Chennai reviewed and discussed the application for approval "A early functional outcome of arthroscopic stiff shoulder release in adhesive capsulitis – For Dissertation Purpose" submitted by Dr.K.Sundaramoorthi, Post Graduate in MS (Ortho), Govt. Kilpauk Medical College, Chennai.

The Proposal is APPROVED.

The Institutional Ethical Committee expects to be informed about the progress of the study any Adverse Drug Reaction Occurring in the Course of the study any change in the protocol and patient information /informed consent and asks to be provided a copy of the final report.

14/05/15

CHAIRMAN,
Ethical Committee
Govt. Kilpauk Medical College, Chennai

GOVT. KILPAUK MEDICAL COLLEGE
14 MAY 2015
Kilpauk, Chennai-10.

14/5/15